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Raymond J. Penn

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S. V. Ciriacy-Wantrup

Economic Basis of Land Reform in Underdeveloped Economies
Erven J. Long

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From Report of Board of Regents, University of Wisconsin, 1894

This magazine exists to provide an outlet for a wide variety of scholarly studies in land economics. It reflects the growing emphasis on planning for the wise use of urban and rural land to meet the needs of an expanding population. Housing, air and water use, and land reform are within its scope. It views land economics as economics in the broadest sense with particular emphasis on public action to achieve the best use of resources in the public interest.

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LAND ECONOMICS

a quarterly journal of

PLANNING, HOUSING & PUBLIC UTILITIES

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VOLUME XXXVII
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Public Interest in Private Property (Land)†

By RAYMOND J. PENN*

"The most profound development in the last few centuries of world history unquestionably has been what Karl Polanyi calls the Great Transformation—the transition of society from a feudal to a market economy.

"Under feudalism, the common denominator of all social relations was the tenure under which men held land. The whole fabric of feudal society was tacked down at all strategic points to the land. Political power, social prestige, material wealth, and justice—all of these for any man were related to and dependent upon his land tenure status. . . .

"Sometimes we in the United States are apt to forget that feudalistic customs constitute a heavy barrier in many lands against the introduction of democratic principles of social organization. We forget that, in many parts of the world, agrarian feudalism lasted until late in the nineteenth century; that, in some countries, the break from feudalism has begun only since World War I; and that, in parts of many countries even to-day, a paramount social question is, 'How can we break the fetters of a feudalistic land system?'

"The problem of eliminating the vestiges of agrarian feudalism is of course bound up with the equally difficult problem of determining upon some other land system that will allow men the freedom and equality which feudalism does not allow, but that will still give men that degree of security which will assure the needed production of food and raw materials, the conservation of natural resources, and human satisfactions in living. In all parts of the world there are literally millions upon millions of people to whom this question is the great unsolved riddle of social organization."[1]

THIS QUOTATION from a paper by the late Leonard A. Salter, Jr., published after his death, states quite clearly the central issues of land development and agricultural reform.

It is hard for us in the United States to realize how many people, in how many parts of the world are trying to untie themselves from feudalism. In varying degrees, both the poor farmer of the Andean Mountains and the agricultural worker on the large irrigated farm have seen that land ownership carries with it more than the right to manage the land and the income from it. In a sense, ownership of land carries with it ownership of government—the right to tax, the right to enact and enforce police regulations, and the right to judge. In addition, decisions on investments in social capital—education, transportation, hospitals, power projects—appear to be the prerogative of land ownership.

So, to the "campesino" ownership of land is both the symbolic and the real source of a new kind of life. It gives him food to stay alive, but it also gives him the right to build his own house in which to raise his family. It gives him, too, the right to tax himself to build a school. Is it any wonder then that land reform assumes major importance to those people who are still living under vestiges of feudalism, or at least outside of the market economy? To a simple view, what Latin America wants is to industrialize, to expand production and increase the domestic market; in short, to raise the standard of living of the people.

From any point of view, these Latin American countries can do this only if all of their people are part of the economic system. They must produce to sell: and they must have the power to purchase. This requires a shift from feudalism to some form of market economy —an economy where division of labor is possible and where there is some reasonable security of expectations.

All countries are, of course, at different stages in this development from feudalism to a market economy. The process of the shift is different from one country to another, too. However, nearly everything I have read and the very little I have seen of Latin America leads me to believe that the basic issue is how to absorb the nearly 50 percent of the population into productive jobs in the economy.

Let me point out that the problem would be relatively easy if it were only what it appears to be—making more land resources available to the landless. It is that, yes, but it is much more. The pressure for land reform is, in actuality, pressure for a major change in the structure of the economy. I submit that what the landless of Latin America want, and what the economy of Latin America demands, is more than the breaking up of large landholdings. It is the breaking up of the bundle of rights which have so long been a prerogative of the large landholder and denied to the landless.

It is perhaps natural that we in the United States take a much more limited view of land reform. Our own nation was founded at a time when Europe was breaking away from feudalism; and our

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† The ideas presented in this article constitute the theoretical portion of a paper presented by the author at the Conference on Land Problems and policies, held in Santiago, Chile under the sponsorship of the International Cooperation Administration in February 1961. ICA representatives from twenty Latin American countries were in attendance.

* Professor of Agricultural Economics, University of Wisconsin. The author is indebted to Professor Bryant Kearl, University of Wisconsin, for many of the ideas and for invaluable aid in putting this manuscript into final form.

[1] Leonard A. Salter, Jr., "Do We Need a Land Policy?", *The Journal of Land & Public Utility Economics*, November 1946, pp. 310–311.

Constitution was established on the liberal ideas of those who knew what feudalism was and why it must be abandoned. The Constitution sets up courts, a police force and legislative authority apart from the ownership of land. Thus feudalism never really got established in the United States and some rather violent "rent wars" in New York in the 1840's dealt the final blow to the patron system.

Property in the United States still carries with it rights to land and the products from that land. It also imposes responsibilities on others to respect those rights. But the landless and those who own only a little have ways open to protect themselves and to advance. They can go to court and can count on fair treatment if the landowner abuses them. They can put pressure on the legislature for social security, minimum wages, safety requirements, and unemployment protection. Credit sources make land purchase more feasible. They can acquire property rights in industry; or, through their union, even feel that they have some security in the form of the laborer's right to a job.

So let me repeat, it is natural for us in the United States to look at land development and land reform issues in Latin America and also in other parts of the world in such a restricted way that we may miss the issue completely.

There is another reason why one needs to differentiate between the meaning of property in the United States and in countries that still have some feudalism. We think of United States firms as going into foreign countries and operating pretty much as they do in the United States, with labor and capital sharing the same rights and responsibilities as they do in the United States. Generally, however, this is not the case. When a company acquires property in another country it will generally follow the rules of that country. Willingly or not, it will find itself exercising the landowner's prerogatives of that country. It may furnish better than average facilities and conditions of employment for its laborers. Yet a United States company in a feudal country becomes a symbol of the general ownership structure of the past and, as such, the target of land reform programs. To put it bluntly, United States industry cannot operate in a feudal country without accepting the rules of feudalism and thus sharing the villain's role for those who want to strengthen the economic and legal position of the landless and jobbers.

Up to now we have been talking about the nature of private property in land and how the concept may be different in different countries or even in different parts of the same country. Now we come to the question of using resources in the public interest. Most of us would agree that the national interest (and simple justice) require that the use of resources be designed to bring the greatest good to the greatest number. This is what we mean by the *public interest.*

In the United States we feel we have a sort of built-in automatic regulator of public interest. In theory at least, each person does what he considered best for himself. He buys or sells land or any other product. He makes the most profit he can. Prices will fluctuate, production and demand will adjust, and competition will force each of us into his most productive employment. Hence, the sum of the maximum incomes of individuals will result in maximum public welfare.

On the strength of this idea the United States proceeded late in the nineteenth century to give almost complete and in-

violate private property rights in land. It is my feeling that this was possible only because of the large amounts of unoccupied land in the United States. At any rate, the United States encountered a number of problems in land use and in each instance the issue developed because individual responses to the automatic pricing mechanism were different from what the public wanted. For instance, the best interest of the heavily mortgaged farmer was to cultivate as intensely as possible even though the farm would wash away and a resource be destroyed as a result. The timber owner could make the most profit for himself by clear-cutting his land. The stockbroker would profit most by selling stock to an uninformed customer for more than it was worth. Our response to these abuses was not to abandon the price mechanism as a way of allocating resources, but to modify it by specific restrictions on what individuals could do.

In the twentieth century, with rapid increases in population, expansion of cities, greater demand for land and water, etc., the public interest in land use has come into focus more clearly than before. In the United States today I think we may fairly say that community land use planning (zoning, local government and services, etc.) is a public policy matter second only to international relations. Land use planning is our response to the challenge of protecting the public interest against unrestricted use of land by its owner contrary to the public interest.

The idea that private property in the United States was absolute and inviolate led Karl Marx into an erroneous forecast. He thought the power accompanying ownership of productive resources would become so concentrated in the hands of a few, and these few would abuse the rights of the many so outrageously, that revolt would be inevitable. Marx missed the forecast because he saw only one part of the picture. He failed to see that an individual without private property rights may still, under a farsighted governmental structure, have procedures available and freedom to develop new ones that will act in the larger public interest—restraining private interest if and when that becomes necessary.

I would like to draw a sharp distinction between public interest and public authority or government. Governmental authorities often come to believe that their actions are the only ones invested with public interest. This is true everywhere; it is true in the United States all too often. A conservation department considers its decrees synonymous with public interest and accuses its opponents of selfishness or dishonesty or both. A highway department puts its road-building program above any other land use or use of tax money in the public interest. Fortunately there are always groups or agencies to challenge such arrogance, often even within the government itself. In those countries with one-man control of government or with a dictatorship of a few, and with restrictions on freedom of speech and press, it is much more serious to consider government authority and public interest one and the same.

Public interest it seems to me should be the view of the public—of the people. Actions of individuals are often in the public interest; sometimes even when they conflict with governmental policies. Resolving conflicts between individuals, even on what might be thought of as private matters, may also be in the public interest. And of course projects which cannot be done by individuals or whose

benefits are widely dispersed are the most commonly considered to be in the public interest.

What does it take to define and determine what is in the public interest? Three things, I think. People must have an opportunity to express their desires, the right to get together in groups and arrive at decisions, and some bargaining power to put the group decisions into effect.

Procedures are important. We need procedures to help in arriving at group decisions (planning or policy formation). We need procedures which give the people power in putting their plans (their wills) into operation. And of course we need procedures to protect minorities. The force of public interest thus defined can be brought to bear not alone on the recalcitrant individual but also on the government agency that is failing to do a job that is needed—and may even be brought to bear on the government itself.

I submit that the most important ingredient in economic development is for people (the public) to have authority to express their interest. Land ownership was, at one time, the only channel through which this could be done. Today other procedures of a society give the public this force. The procedures must be flexible so that the structure can be continually changing to meet the needs of the times. When an institution or a rule is inadequate for current needs, it must be changed—either with orderly procedures or in a more violent manner. Witness the sit-down strikes in the 1930s or the Iowa judge unable to foreclose on a farm; these were violent reactions to rules too rigid for the public interest. The violence of the change is, I think, in direct proportion to the inappropriateness of the rule or institution and the rigidity with which it is held.

Public interest and procedures to give it expression in a continuing and orderly manner have not been conspicuous in Latin America. But such procedures must and will be developed. Latin America will not follow our procedures but they may find our experience useful in their own planning. Let me very briefly review the procedures we use in the United States to exert public interest on the use of land.

(1) *Police Power.* People, through their government, can pass such laws as are necessary for health, safety, security, and national welfare in regulating an individual's land use. We are required to stop at a stop sign, we cannot open a store in a residential area, we cannot plow up sod in some soil conservation districts in the Great Plains. This is strong authority; so it is limited. It is not to be used unless it is necessary to protect the *public health, safety, morals* and general welfare. It cannot be arbitrary and it must have some relation to the desired goal. It cannot confiscate the property. In addition, it must involve *due process of law* for the individual. He must be notified, have an opportunity to be heard, and have access to the court if he feels damaged.

(2) *Taxation.* People can levy taxes on land and income to support their government. These taxes must be uniform—similar pieces of land must pay the same tax. Taxes must be used for public purposes to finance the government. We in the United States have a rule that taxes are not to be used for regulation; though one from Wisconsin must say that with tongue in cheek. History has ample evidence that the power to tax is the power to destroy. All the more reason why it must be exercised locally, democratically, and with a broad sensitivity to the public interest.

(3) *Eminent Domain.* If the public must have a person's land it can be taken. This, too, is a power so strong that rigid limits have been placed on it. Any land taken by the government must be used for a public purpose. Highways, railroads and public utilities, schools, etc. are considered public but, in general, we could not use this authority to take land from one private person and give it to another for private use, as would be done in a land distribution program. Urban redevelopment (slum clearance), however, has used this authority to take private land, change its use, and return it to private use. The owner is compensated for the land taken but his only basis for contesting the action is the adequacy of the compensation and the validity of the public interest.

(4) *Spending Power.* Governments can have major effect on land use by the decisions made about spending. Roads, schools, power projects, airports, defense and other government purchases all can have a major effect on land. Subsidies, as well as taxes, can guide the nature of private land use. Considerable public expenditures will be needed in most of the settlement projects I have seen in Latin America. Spending power is important in economic development anywhere.

These, then, are some of the basic tools by which the people express their public interest in private land in the United States. Often, without changing ownership these tools give the government power over private property when it can demonstrate that its actions are in the public interest. Tools such as these are, of course, the particular peculiar combination that has grown out of the United States history and culture. Other cultures will find other ways in which people can give their interest form and force. Successful development of ways to express the public interest may let us substitute moderate changes in the structure of the economy for violent changes in the economic system. One way or other, however, peoples will break with feudalism (as we ourselves did) and establish the authority of the public interest against the authority of centralized government or economic class.

I have directed my attention in this paper primarily to land problems and policies as they relate to economic development. But *land* policies and *trade* policies and *national fiscal* policies and *total economic development* are all part of the same structure. Perhaps I can be excused, as a land economist, for feeling that land policies are strategic to these other areas of vital national concern. But as a social scientist of wider interests and as a person of deep democratic convictions, I must also make it clear that land ownership is a burning issue in Latin America only because of the other powers that, in a feudalistic society, accompany the ownership of land. The peoples of Latin America feel a passionate concern about owning land because owning land is their route to personal security, to autonomy, to freedom from arbitrary subjection to the will of others. It is, however, only one of several routes. It may, in fact, be a disappointment and a delusion if the other requisites of political and economic security are not present.

Conservation and Resource Programming †

By S. V. CIRIACY-WANTRUP*

Definition of Terms

IN ORDER to avoid possible misunderstanding, the key terms of this paper require a few words of explanation.

The term *resource programming* has recently become popular in a broad informal sense—as a substitute for *resource planning* which has been in vogue since the early 1930's. This popularity can be traced to the impact, during the 1950's, of programming in its formal sense—as an operationally efficient mathematical technique for obtaining optimum solutions in planning problems.[1] This impact on problem-solving spread quickly from planning for the United States Air Force and similar large organizations to the applied phases of many natural and social science fields; for example, engineering, econometrics, and economic geography.

Some students, among them a well-known economic geographer, have compared the importance of formal programming to that of the atomic bomb.[2] Appraisal of this importance in the economics of conservation is a major part of my assignment. For this purpose I shall interpret the term *resource programming* as including but not as restricted to its formal varieties, such as linear, nonlinear, and dynamic programming.

Next, let us turn to the term *conservation*. Generally, conservation is regarded as a subject of the natural sciences or the domain of the idealist. But it is also a vital and interesting subject of economics. In essence, the concern of the conservationist and the economist focuses on the same problem. This problem is the relation of past and present to future use of natural resources. Hence, a semantic bridge between the conservation movement and economics would seem more helpful than strengthening the existing semantic barrier. In the absence of such a bridge, the term *conservation* will continue to be used to obtain political support for programs whose effects on natural resources are frequently not understood or are contradictory.

Economics is the systematic study of choosing between alternatives. In such a study of decision-making, alternatives involving time are among the most significant ones. Hence, the choice between different time distributions of the use of natural resources and the relation between past, present, and future uses are highly significant economic problems. By saying that they are economic problems, I do not imply that it is always meaningful or necessary to express them quantitatively in pecuniary terms or that the programming of aesthetic, educational, or scientific uses of natural resources can be neglected—as is so frequently alleged

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† This paper was presented at the Symposium, "Programming the Use of Natural Resources," Annual Meeting of the American Association for the Advancement of Science, Section E (Geography and Geology), New York, December 30, 1960.

* Professor of Agricultural Economics, Economist in the Agricultural Experiment Station and on the Giannini Foundation.

[1] The origin of formal programming—as *linear* programming—is generally dated with the unpublished papers by Jerome Cornfield (1941) and G. B. Dantzig (1947). The latter paper was published as "Maximization of a Linear Function of Variables Subject to Linear Inequalities" in T. C. Koopman's (Ed.) *Activity Analysis of Production and Allocation* (New York, New York: John Wiley and Sons, 1951). The title of the Dantzig paper can serve as a definition of linear programming.

[2] William L. Garrison, "Spatial Structure of the Economy," *Annals of the Association of American Geographers*, June 1959, p. 232. See also, Merrill M. Flood, *American Scientist*, December 1958, p. 358 (book review).

for economic analysis. I shall return to this problem presently.

To say that conservation is concerned with the relations of past and present to future use of natural resources is not a definition. There is no *best* definition for all purposes. Since 1941 I have been using a definition of conservation that has proved most useful for the purposes of economic analysis.[3] *Conservation* and its logical corollary *depletion* are defined in terms of changes in the intertemporal distribution of physical rates of resource use, implying comparison of at least two actual or hypothetical time distributions. Such comparison requires a weighting system in which distance in time is used as weight. The statistical problems encountered in weighting are similar to those in any index of physical output.

One aspect of a definition based on physical use rates is that it is neutral in terms of values and value judgments. Thus, it does not say anything about the economic objectives and criteria of conservation. An additional term is needed that involves valuation and refers to an economic optimum in the time distribution of physical rates of resource use. For short, this is called the *optimum state of conservation.*

The Optimum State of Conservation and Resource Programming

At first sight it appears that the techniques of formal programming would be highly useful for determining the optimum state of conservation. Such determination involves a time allocation of inputs and outputs in resource use which maximizes social welfare under constraints pertinent to the investigation. Formal programming is designed precisely to solve problems of this kind.

Since alternatives are characterized by differences in dating and since an optimum time path of resource use has to be determined, an extension of the technique becomes necessary. Such an extension, through use of Lagrange multipliers, is known as *dynamic programming.* The same device has been employed in the conceptual determination of the optimum state of conservation for many years.[4] Actual quantitative determination of the optimum state of conservation through dynamic programming has not yet been attempted. But resource economists should approach new techniques with an open mind and not see a "quantitative bogey man" behind every equation, as an editorial in *Economic Geography* has advised recently.[5] With this advice, I am in full accord.

On the other hand, it would be equally shortsighted not to recognize significant conceptual and operational difficulties that limit the usefulness of quantitative optimizing in economics--especially in the economics of conservation. These limitations apply no less to informal programming (for example, benefit-cost analysis) than to the formal kind. However, they are more concealed in the implicit assumptions of formal programming; and its comparative efficiency and the precision of its results have led to an enthusiasm that frequently overlooks the limitations.

These limitations are more severe for conservation decisions by federal, state,

[3] S. V. Ciriacy-Wantrup, "Private Enterprise and Conservation," *Journal of Farm Economics,* February 1942. Paper presented before the Annual Meeting of The American Farm Economic Association, New York City, December 27–30, 1941.

[4] Harold Hotelling, "The Economics of Exhaustible Resources," *Journal of Political Economy,* April 1931, pp. 137–175. See also, S. V. Ciriacy-Wantrup, "Private Enterprise and Conservation," *op. cit.,* pp. 82 and 83.

[5] Brian J. L. Berry, "The Quantitative Bogey Man," guest editorial, *Economic Geography,* October 1960.

and local government—that is, for conservation policy—than for conservation decisions by subsectors of the economy such as individual farms and industrial firms, which operate within the framework of the "rules of the game" established by policy. This paper is mainly concerned with conservation policy. It should be mentioned that the difference in the usefulness of quantitative optimizing between decision-making by government and decision-making by economic subsectors is not confined to resource economics.[6]

The difficulties which I have in mind may be discussed as three interrelated problem areas which will be called here (1) the problem of valuation, (2) the problem of institutional constraints, and (3) the problem of uncertainty. These broad problems are present in the programming of all natural resources.

The Problem of Valuation

Quantitative optimizing in economics requires that commensurate indicators of value attach to all physical inputs and outputs of resource use—at least in relative terms. Market prices are taken as starting points and bench marks in valuation. While one may be in favor of judiciously expanding the area of pecuniary evaluation for purposes of public policy,[7] one should not forget that there will always remain a large portion of social benefits and costs for which such evaluation would be meaningless. Neglect of such *extramarket* benefits and costs introduces a systematic bias into quantitative optimizing.

Resource economists have stressed the significance of specific extramarket benefits and costs for some time.[8] In 1958 John Kenneth Galbraith called attention to them with special reference to affluent societies—like that of this country.[9] Emphasis is given to the increasing lack of what is called *social balance* between the products supplied by the market economy and products such as parks, playgrounds, and education, which are publicly supplied and financed by general taxation rather than sale. The supply of extramarket goods has an inherent tendency to lag behind the supply of market goods because modern advertising and emulation, which are largely responsible for demand shifts in affluent societies, operate exclusively in favor of market goods.

Extramarket goods, however, are only a part of the valuation problem. No less significant is the question: to what extent are present and projected market prices, where they exist, valid and relevant indicators for public policy? To what extent, for example, are the prices of agricultural products and of their cost factors relevant for programming public water resources development?

At this point I do not refer to the price and income effects of the development itself, to external economies and diseconomies, nor to economic fluctuations. Solution of these problems is often difficult but practical approximations can be found.

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[6] While the conceptual limitations of quantitative optimizing for subsectors are less than for policy decisions, the problems posed by the availability of data for smaller statistical aggregates are frequently greater.

[7] S. V. Ciriacy-Wantrup, "Benefit-Cost Analysis and Public Resource Development," *Journal of Farm Economics*, November 1955. Paper presented before the Annual Meeting of the American Association for the Advancement of Science, Joint Session, Section K (Economics) and M (Engineering), December 27, 1954.

[8] S. V. Ciriacy-Wantrup, *Resource Conservation, Economics and Policies* (Berkeley, California: University of California Press, 1952), 381 p.

[9] J. K. Galbraith, *The Affluent Society* (Boston, Massachusetts: Houghton, Mifflin and Co., 1958).

More basic difficulties are created by the fact that the functioning and results of the price system itself are profoundly affected by income distribution, market structure, and many public policies inside and outside agriculture. Formal programming looks at these influences as institutional conditions which—together with the technological ones—are introduced into the optimizing calculus as constraints. Only too often investigators are not aware of the severe limitations which this procedure imposes on the validity and relevance of quantitative optimizing if the results are to serve as a basis for decision making in public policy. To me at least, the implications seem so important that several of them need to be explored in the present context.

The Problem of Institutional Constraints

First, when social institutions are used as constraints, they become conceptually indistinguishable from social objectives. In this respect, they are different from technological constraints. As explained elsewhere,[10] in natural resource policy, changes of social institutions are among the most significant controllable variables and relations. In other words, in natural resource policy, social institutions must frequently be regarded as means rather than ends. Hence, the distinction in econometrics between the part of the model that constitutes the *objective function* to be maximized or minimized and the part that constitutes the constraints describing the structure of the operation and the relations between variables becomes misleading if the conceptual difference between technological and institutional constraints is not sufficiently recognized.

Secondly, when social institutions are used as constraints in a quantitative optimizing calculus, a new optimum must be calculated for each combination of constraints that is considered. The optima calculated for different sets of constraints are then compared. Recently, a whole literature has grown up around this approach known as *the theory of second best.*[11] This term merely indicates that there is at least one constraint additional to the ones existing in the so-called *Pareto optimum.*[12] The exponents of this theory claim that the major contribution is a negative one: If a deviation from one of the Pareto optimum conditions prevails, the best course of action is not an attempt to attack this deviation and keep all others intact. On the contrary, a second-best solution is usually obtained only by departing from all other Pareto conditions. To apply only a part of the Pareto conditions would move the economy away from, rather than toward, a second-best position. In consequence, the exponents of this theory direct their criticism against what they call *piecemeal welfare economics.*

If this criticism is valid—I believe it has some merit—does it not point to a basic weakness in the logic of quantitative economic optimizing itself? If one tries to avoid the futility of piecemeal welfare economics and strives for bold changes in the combination of constraints, can one be sure that quantitative optima are comparable in a meaningful way? Is it not unavoidable that such

[10] S. V. Ciriacy-Wantrup, *Resource Conservation . . .*, especially chapters 16–21.

[11] R. G. Lipsey and R. K. Lancaster, "The General Theory of Second Best," *The Review of Economic Studies,* 1956–1957, pp. 11–32. The earlier literature is cited in this article.

[12] Wilfredo Pareto, *Cours d'Economique Politique* (Lausanne: F. Route, Libraire-Editeur, 1897). An excellent bibliography of welfare economics is appended to: E. J. Mishan, "A Survey of Welfare Economics, 1939–1959," *The Economic Journal,* June 1960, pp. 197–265.

bold changes affect some structural elements of the optimizing calculus—among them especially preferences, technology, and the motivation of human agents in their various functions in the economy? Are we not confronted with a problem of identification, in the econometric sense, on a grand scale?

In view of these questions, I should like to submit that optima of social welfare are constructs in the sense of useful scientific fictions.[13] Such constructs are not operational policy objectives. There is danger that the two are confused when formal programming is used to obtain quantitative optima for large social aggregates.

On the other hand, as fictional constructs, social optima are useful as organizing principles for the great number of controllable and uncontrollable variables and kinds of relations that must be considered in welfare economics—to decide which ones to bring into a particular investigation explicitly, which ones to neglect, which ones to combine with others, and which ones to take into account as constraints. In policy investigations, special care is needed to decide whether social institutions should be treated as constraints. An alternative treatment, just implied, will be sketched later.

The Problem of Uncertainty

Let us now turn to our third set of problems. Uncertainty is especially important in those areas of economic decision-making where time is a significant element in differentiating alternatives. This, as we know, is especially true of the economics of conservation.

The most important uncertainties, those created by changes of technology, of preferences, and of institutions, increase with time. The probability of such changes is not amenable to precise quantitative measurement. At best, the direction, the relative speed, and the range of such changes can be vaguely projected. Other uncertainties, for example, the occurrence of drought, floods, and hail storms, do not increase with time and their probability can be measured quantitatively. Economists frequently refer to these uncertainties as *risk* in order to differentiate them from the former. Techniques to allow for uncertainties of the latter kind are being developed in formal programming. The former kind of uncertainty imposes severe limitations on the relevance of quantitative optimizing for policy decisions.

Practitioners of formal programming who are also competent economists are aware of these limitations. Robert Dorfman, for example, in a recent appraisal of operations research states: "Another important limitation, in which less progress has been made, is that linear programming formulations do not allow for uncertainty."[14] On the other hand, one may wonder whether the enthusiasm of many less critical practitioners might not delay acceptance of formulations that would allow for uncertainty.

In the economies of conservation, allowance for uncertainty is best made, I believe, through the formulation of the policy objective itself. Such a formulation I have called *the safe minimum standard of conservation*. A detailed explanation of the theoretical development

[13] The usefulness of scientific fictions was discussed on a previous occasion: S. V. Ciriacy-Wantrup, "Policy Considerations in Farm Management Research in the Decade Ahead," *Journal of Farm Economics*, December 1956, pp. 1301–1311. Presented before the Annual Meeting of the American Farm Economic Association, Asilomar, August, 1955.

[14] Robert Dorfman, "Operations Research," *The American Economic Review*, September 1960, pp. 575–623.

of this concept and its operational application is found elsewhere.[15] Space limitations permit merely stating that one aspect of the economic rationale of the safe minimum standard of conservation as a policy objective is to minimize maximum possible social losses connected with avoidable irreversibilities. In this respect the safe minimum standard of conservation may be regarded as a conceptual relative of the well-known min-max solution or *saddle-point* in a two-person, strictly determined game.[16] This is not to suggest, however, that all aspects of the economics of conservation should be forced into the framework of modern game theory—as "man playing against nature" in an almost literal sense.

Conclusion

It may be concluded from this sketch of three important limitations that formal programming is most useful when the model is little concerned with values, when the treatment of social institutions as constraints is logical, and when the influences of time and uncertainty are small. Stated differently, formal programming is more useful in engineering than economics, more for private than for policy decisions, and more under static than under dynamic assumptions. Usefulness for natural resource policy is limited on all three counts.

It is interesting to observe that the more sophisticated practitioners of formal programming design their models in such a way that the three limitations are involved as little as possible. The resulting models are engineering rather than economic ones. An engineering model, however, can throw light on some aspects of the economic issues. Examples in water resources programming are Dorfman's "Simple Valley" and Tolley's "Optimal Water Allocation."[17] The former model is purely hypothetical, designed to illustrate the technique. The latter model deals ex post with an actual allocation through existing social institutions. Under assumptions most favorable to formal programming, allocative efficiency is improved by no more than five per cent. Careful comparative studies of this kind are only too rare.

On the positive side, it may be concluded that resource programming in the informal sense must include the programming of social institutions. Resources programming must be pragmatic; that is, it must regard institutions as means (tools) as well as ends (objectives), depending upon the purposes of the analysis.[18] In natural resource policy, an analytically-oriented institutional economics is by no means obsolete.

In such an approach, institutions are regarded as structured systems, each with particular patterns of change over time. These systems can be analyzed in structure, functioning, performance, and change over time. Their purpose is not to obtain quantitative optima of social welfare at given points in time under condi-

[15] S. V. Ciriacy-Wantrup, *Resource Conservation . . .*, especially chapters 17 and 18.

[16] Johann von Neumann and Oskar Morganstern, *Theory of Games and Economic Behavior* (Princeton, New Jersey: Princeton University Press, 1944), 625p. See also, Robert Dorfman, Paul A. Samuelson, and Robert M. Solow, *Linear Programming and Economic Analysis* (New York, New York: McGraw-Hill Book Co., 1958), chapters 15 and 16.

[17] Robert Dorfman, "Simple Valley," *Economics of Watershed Planning*, edited by G. S. Tolley and F. E. Riggs (Ames, Iowa: Iowa State University Press, 1960); and G. S. Tolley and V. S. Hastings, "Optimal Water Allocation," *Quarterly Journal of Economics*, May 1960.

[18] On the schism between *orthodox* and *pragmatic* attitudes toward social institutions, see: F. O. Sargent, "A Methodological Schism in Agricultural Economics," *Canadian Journal of Agricultural Economics*, 1960, pp. 45–52.

tions projected for these points. Rather, their purpose is to increase social welfare continuously under constantly changing conditions that at any point in time can be projected only vaguely and are always uncertain with respect to actual occurence. Responsiveness of these systems to economic change is more important than their efficiency in optimizing under particular sets of projected conditions.

Hence, appraising the performance of these systems by introducing arbitrary temporal cross-sections of them as alternative constraints in formal programming is inappropriate. Performance can be appraised only by criteria applied to alternative systems as they function over time. Such criteria need not always be pecuniary. As has been shown elsewhere, nonpecuniary criteria can be effectively employed.[19] Such an appraisal is an integral part of the field of economics, which includes econometrics but is not restricted to it. A restriction of this kind would be especially unfortunate in programming the use of natural resources.

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[19] S. V. Ciriacy-Wantrup, "Concepts Used as Economic Criteria for a System of Water Rights," *Land Economics*, November 1956, pp. 295–312. Also published in *The Law of Water Allocation in the Eastern United States*, edited by David Haber and Stephen W. Bergen (New York, New York: The Ronald Press Co., 1958), pp. 531–552.

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The Economic Basis of Land Reform in Underdeveloped Economies†

By ERVEN J. LONG*

I.

LAND REFORM is one of the cornerstones of agricultural policy in most underdeveloped countries. These reform programs or proposals usually have three basic objectives—mixed in different combinations depending upon political and historical circumstances. These are: (1) turning over ownership and management of the farms to those who actually "till the soil," (2) dividing up large holdings into smaller, more evenly distributed holdings, and (3) combining small operational units into larger, group units —i.e., "co-operative farms," "collective farms," "paysannat," "state farms."

Even cursory examination of these objectives will show that they may be—and in many cases are—in conflict with each other. Steps taken to implement one objective may very effectively counteract steps taken to implement another. For example, many of the farms which could best serve as examples of realizations of objective one, i.e., farms fully managed and operated by the owner and his family, exceed the acreage ceiling and so would be broken up in effecting objective two. Furthermore, the achieving of objective three almost inevitably involves surrender, or at least radical change in the character, of objectives one and two. Paradoxically, local protagonists of "land reform" usually support all three objectives, while opponents resist all three. This testifies to the fact that progress on such reform has not been far enough to bring their divergencies into active conflict with each other.

Four years' experience in India has brought me to the conclusion that most proponents and opponents of land reform are honestly concerned with the problems of their country and believe their particular ideas on the subject to be sound. It has brought me even more firmly to the conviction that virtually

†An earlier draft of this paper has had very substantial review by a large number of persons. All have written extensive, carefully thought-through comments, most of which have found their way into this final version. Although almost all of the reviewers have agreed with the major theses in the paper, and I have tried to incorporate their several suggestions, the final responsibility is of course my own. I should like here to express my sincere appreciation to the following: F. W. Parker, Assistant Director-General, Food and Agriculture Organization (hereinafter referred to as F.A.O.) and previously Chief Agriculturist, International Cooperation Administration in India, to whom, more than anyone, the paper owes its existence. Russel O. Olson, previously Ohio State University's Group Leader in India; Dr. George Montgomery, Kansas State University's Group Leader in India; Rainer Schickele, Director, Land and Water Division, F.A.O.; W. Ellington, Economic Analysis Division, F.A.O.; E. O. Jacoby, Chief, Land Tenure and Settlement Branch, F.A.O.; Sushil K. Dey, Special Assistant to the Director-General, F.A.O.; Sherman E. Johnson, Chief Economist, Agricultural Research Service, United States Department of Agriculture; Karl Shoemaker, Chief, General Economics and Rural Sociology Branch, Agricultural Economics Programs Division, Federal Extension Service, United States Department of Agriculture; and M. B. Badenhop, Agricultural Economist, University of Tennessee program in India. Appreciation is also expressed to Mr. Ray and Dr. Agrawal for assistance acknowledged elsewhere.

*Group Leader, University of Tennessee, International Cooperation Administration Contract, Bangalore, India.

none of the argument, for or against such reform, is built upon a solid, analytical, factual base. I suspect that this is true in most such countries where land reform is a burning social and political issue. If this were not true, surely both proponents and opponents would be more discriminating in their arguments, selecting certain types of reforms for their fervid support and other types for their equally fervid opposition.

It is at this point where I feel the so-called "foreign expert" can be most helpful in helping set up research and in relating available data to provide a reliable, factual basis for decision in the matter. What is lacking is not ideas but information; what is needed from us is not nostrums but evidence.

II.

Behind all the political discussion of land tenure reform is an honest groping for a system which will satisfy two deep and basic needs: (1) a much more productive agriculture as a base for national economic development, and (2) a sense of security (and participation) among the peasantry as a basis for needed political stability. Unfortunately these also are often inconsistent ends; economic progress itself is frequently a powerful catalyst of social turbulence and political instability. At best, many measures to achieve economic progress have very disrupting side-effects. Political generalship of the highest order is required to resolve or compromise these issues. Surely the political leaders require and deserve the best possible supply of reliable evidence, relating actions to their probable consequences, as a basis for forming these difficult judgments.

Evidence regarding the second issue—relating land reform proposals to their probable consequences for social and political stability or instability—is obviously hard to come by. People's social responses to given stimuli vary greatly from place to place and from moment to moment. People are highly capricious in this respect; any overt step taken by government is but one event in a long historical continuum. Its results will depend almost entirely upon its historical antecedents. Failure of a government to take a specific action might cause a social flare-up now which that action itself would have caused a decade or two ago. A healing social ointment in one setting may prove a blistering caustic in another. Social scientists might well be excused for not having provided highly definitive evidence on this issue.

And yet, quite a little has been done. Many, many articles and books have dealt directly or indirectly with various aspects of the problem. Historical examples—and in a few cases even studies—have been extensively cited from which inferences were drawn regarding the effects of various land reform measures upon social stability. Such inferences are almost inevitably gross in character. Many causes interact to bring about the consequences noted and usually little is done analytically to disentangle these causes so as to assess their individual net contributions to the observed effects. Such gross inferences give full and free play to the analyst's preconceptions and personal convictions, which often provide him with the major premise of his ultimate judgment. Nevertheless, such studies (dare I call them such?) are useful though probably in providing insights rather than reliable evidence. I have a hunch that, if all such studies were collated, a core of agreed-upon basic relationships might be discovered.[1] If so, this would be highly useful; and would be a very good place to begin an effort by

social scientists to provide really meaningful evidence on this fundamental issue.

It is rather on the first issue—the effects of various types of land reform activities upon agricultural productivity—that social science has most seriously failed its responsibilities. This is where the agricultural economists' help is most badly needed and where they should be most able to provide it. The agricultural economics profession possesses the necessary analytical tools to do the job, to throw direct light upon the implications of various aspects of land reform for agricultural productivity. The principal shortcoming appears to be that research has not focused sharply enough on the issue. Such evidence as can be assembled is often oblique to the problem, having been developed with other purposes in mind and thus not interpreted with reference to this problem to which public policy attaches so much importance. In consequence, land reform legislation operates largely in an informational vacuum regarding its economic bases; political leaders are obliged to substitute surmise for evidence and hence preconception for judgment.

The core relationship in this entire problem is that between size of operating unit and productivity. Much of the local argument in favor of cooperative or other forms of group farming, for example, is premised upon the assumption that there is a tremendous efficiency advantage in large-scale operations. Opponents of land reform base their arguments against the establishment of acreage ceilings upon the same premise—that agricultural productivity will be reduced by the reduction in farm size. Persons who might be favorably disposed toward a more equitable division of landholdings, and who would oppose cooperative farming, feel obliged to take the opposite stand in the interest of economic development because they assume that there is tremendous positive returns to size-of-operations in agriculture. Political reasoning about land reform, somewhat subconsciously perhaps, appears to follow some such process as this: (1) Political requirements (and perhaps "social justice") demand the breaking up of larger into smaller holdings. (2) Because of the high man-land ratio, this involves setting acreage ceilings at levels far below optimum efficiency levels. (3) Since the economy cannot stand the strain of reduced productivity, these small units must somehow be recombined into larger group-units, or cooperative farms; or at least a large number of such cooperative farms are necessary to offset the reduced productivity potentials of the small owner-operated farms.

It can be seen that this reasoning process is premised throughout on the assumption of a highly positive relationship between size of farm operations and agricultural productivity. But this is by no means an established fact. The assumption is based upon a misinterpretation of the economics of so-called "western" agriculture and I fear even more so upon a misinterpretation of American farm management studies. The problem is simply different in the developed than in most of the underdeveloped countries. More specifically, the measures of agricultural efficiency appropriate to the developed countries are inappropriate to most of the underdeveloped countries. This statement requires some explanation.

[1] From his own observations and study of this issue, the writer would use for such an inquiry, as his key hypothesis, that a system of owner-operated farms of such size as to require family labor only would contribute the maximum toward political and social stability.

III.

Literally hundreds of American studies have confirmed that larger farms normally have correspondingly higher operator incomes, i.e., higher returns to the managerial and labor contributions of the farm operator and his family. In common usage this has erroneously been too often taken to be synonymous with greater "efficiency," leading to the conclusion that large farms are more "efficient" than small farms. They are! But only with reference to management and labor, i.e., with reference to returns to the human agent. They are not necessarily the most "efficient" in the use of other (non-human) resources. In the United States and similarly developed economies, this error creates little difficulty because the human agent is from a social viewpoint the most scarce factor of production. Much more importantly, in the United States maximum returns to the human agent in agriculture, which is obviously the economic goal of the individual farmer, is also roughly congruent with the broad objectives of public agricultural policy. And since management and labor are usually supplied by the same social unit, the individual farm family operator's net income is the most relevant measure of the relative efficiency of farms of different sizes. Maximum operator's income serves as an adequate criterion of both private and public policy action. The situation in India and similar countries is very different.

Faced with an imperative need to increase agricultural production, most underdeveloped countries find almost all production factors limiting, *except* labor.[2] From the public or aggregate social viewpoint, the marginal cost of labor approaches zero. In fact, in the judgment of many leaders it is negative—that is, there is a positive social value in employing additional labor, even worth sacrificing some production to accomplish. Prime Minister Nehru makes a telling point that "cottage industries," though inefficient, are justified in that they give larger proportions of the population a sense of participation in the developmentary efforts of the country and hence a more widely spread personal identification with the success of these efforts. In any event, rural unemployment and underemployment being what they are—and with the certain prospect of even much greater pressure of population upon employment opportunities—labor is, from the social standpoint, essentially a non-cost element at any foreseeable levels of increased agricultural productivity. In direct contrast to the case in highly developed economies, therefore, any measure of relative efficiency of farms of different sizes must be in terms of returns to non-labor resources to be relevant to problems in India and similar countries. *Probably a simple measure of gross value productivity per acre, above variable capital costs, is as relevant to policy decisions under Indian conditions as is net operator-income under American conditions.*

If, for India and similar countries, the measure of agricultural efficiency relevant for public policy is simply gross value productivity per acre above variable capital costs, then how is this related to size of farm? Stated more simply, are the returns to non-labor resources higher on the larger or on the smaller farms?

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[2] Much of this paper relates only to so-called "overpopulated" underdeveloped economies. Throughout the paper, India is used as an example of such an economy. There are, of course, several important countries which are extremely underdeveloped yet have extensive unexploited potential farming areas, to which the principal arguments of this paper would not apply. The land reform problem in these countries is, however, much more simple.

This is the question pertaining to the economics of farm size which is really relevant to land reform policy.

A re-look at American data from this point of view might yield some rather startling results. In a study made by the writer,[3] although size of farm was, conventionally, highly related to operator-income, productivity per acre of land was inversely related to size of farm. Many other studies reveal the same thing. Even Dr. Warren's pioneer study of Tompkins County, New York, published in 1911, though making a strong case for larger farms as necessary to high operator income, nonetheless found value productivity per acre to be inversely related to size of farm.[4]

In India, crude observation does not suggest that the level of farming practices is higher on the larger than on the smaller farms. Even most of the very large state-owned farms in India, with their obvious "hidden subsidies," produce little if any more per acre than the small farms in the area. With the exception of the highly specialized case of some of the plantation crops, productivity per acre would appear to be about the same for all sizes of farms or perhaps to diminish as size of farm increases.

Thanks to the work of the Farm Management Research Centers in India some data are available to corroborate these observations. Data are available for samples of one hundred to two hundred farms per state in selected areas of West Bengal, Uttar Pradesh, Punjab, Orissa, Andhra Pradesh, Bombay (2 districts) and Madras. The data cover three years in four cases, two years in three cases and one year in two cases. Because for each state a different size-range was used for computing the frequency distributions, it is impossible to set up a simple table directly from the state data. A composite tabulation, using four size-groups into which all the data could be fitted, shows the following relationships between size of farm and productivity per acre as measured in value of output.[5]

AVERAGE GROSS OUTPUT PER ACRE BY SIZE OF FARM (IN RUPEES PER ACRE)

Size of farm (acres)	*Gross Output per Acre (Rupees)*
0— 4.9	240
5— 9.9	213
10—19.9	171
20 and over	103

The above table shows a very decided inverse relationship between the size of farm and value of output per acre. However, it has the defect, for analytical purposes, that some of this relationship is caused by the fact that the areas of lower productivity per acre tend to be characterized by larger farm units. To overcome this difficulty, the frequency distributions for individual states were recombined and classified into four groups: the smallest size-group of farms, the second smallest size-group, the second largest size-group and the largest size-group. This has the effect of holding differences between states constant in the analysis. Since the sample area studied within each state was chosen to be quite homogeneous, this classification enables us to

[3] Erven J. Long and Kenneth H. Parsons, "How Family Labor Affects Wisconsin Farming," *Wisconsin Research Bulletin 167*, May 1950; also Erven J. Long, "Return to scale in family farming: Is the case over-stated?" *The Journal of Political Economy*, December 1949.

[4] George F. Warren and K. C. Livermore, "An Agricultural Survey, Township of Ithaca, Tompkin County, New York," *Cornell Memoirs No. 295* (Ithaca, New York: Cornell University Press, 1911).

[5] Data supplied by G. D. Agrawal, Production Economist, Directorate of Economics and Statistics, Ministry of Food and Agriculture, Government of India, from Farm Management Center Reports from the referenced States.

determine reasonably well the net effect of size of farm upon value of output per acre. (A somewhat more refined analysis could have been made by recourse to original data but the technique here employed is adequate to the purpose.)

Because of the relatively small sample for each individual state, the relationships revealed are somewhat erratic but a general inverse relationship between size of farm and value of output per acre can be noted. These irregularities disappear when data from all nine states are combined, as shown in the last column of Table I. This column may be taken as a fair suggestion of the relationship between size of farm and gross value of output per acre in India. It clearly calls into question the supposition in much land reform discussion that large farms are more "efficient" than small farms.

TABLE I—Relationship Between Relative Size of Farm and Rupee Value of Gross Output Per Acre From Sample Areas of Eight States: India

	Madhya Pradesh	West Bengal	Uttar Pradesh	Punjab	Orissa *	Andhra Pradesh	Bombay	Madras	Average Eight States
Smallest Group	87	239	292	201	161 (89)	433	117	209	219
Second Smallest Group	88	217	267	186	141 (79)	352	82	171	188
Second Largest Group	84	229	227	173	150 (88)	369	51	75	170
Largest Group	93	169	232	143	126 (71)	380	53	75	159

* Figures in parenthesis refer to output per acre above variable capital costs. See text.

Additional evidence on the relationship between size of farm and productivity per acre has been obtained from a study of 225 farms in three villages of Bihar State, as shown in Table II. These data have the advantage that they relate separately to three villages within which there is great homogeneity with respect to soil characteristics and water resources. It can be seen that, in spite of the rather small number of cases for each village, there is a quite constant inverse relationship between size of farm and gross productivity per acre. The last column, showing the averages for the three villages, evens out such minor irregularities as appear for the individual villages.[6]

As indicated earlier, the measure of efficiency most relevant to land reform policies in India is value productivity per acre above variable capital cost. This would be a somewhat better measure than gross value productivity per acre as used in the above tables as it minimizes distortions due to possible differences in amount of variable capital used by farms of different sizes. Investigation of this point reveals, however, that empirically gross value of productivity per acre is equally adequate under Indian conditions. Variable capital inputs, in the form of seeds, fertilizer, insecticides, etc., are so small as not to affect comparisons, even if there were some consistent bias in relation to farm size—which there appears

[6] Data supplied by P. Ray, Principal, H. D. Jain College, Arrah, Bihar State, from a study to be submitted as a thesis to the London School of Economics. Analysis is being conducted under direction of the writer and M. B. Badenhop and supported by a fellowship grant from the Council of Economic and Cultural Affairs Inc., New York.

not to be. The same is true for investment in tillage and other equipment. Bullock power for farm operations is the largest item of variable capital expenditure. However, because of the tremendous numbers of such cattle in India and the social and religious sanctions requiring their maintenance, these can be considered in virtually the same fashion and for the same reasons as human labor—as a fixed cost input from the social standpoint. To the extent that

TABLE II—GROSS OUTPUT PER ACRE AS RELATED TO SIZE OF FARMS FOR 225 FARMS IN THREE VILLAGES, BIHAR STATE: 1955–56

Size of Farm *(acres)*	Village A 92 farms Rs	Village B 100 farms Rs	Village C 33 farms Rs	Average: Three Villages
0– 4.9	206	384	315	302
5– 9.9	193	337	306	279
10–14.9	178	329	308	272
15 and above ..	173	331	278	261

amount of feed consumed by bullocks is a function of the work they do, such feed is a variable capital input. There is little reason to believe that this is significantly related to size of farm. Value of output per acre above capital costs follows the same pattern as does gross value of output per acre as is shown in the case of Orissa State, where these figures are given in Table I in parentheses alongside the gross output figures. Hence, for our purposes, gross value of output per acre as used in the tables would appear to be from the public policy viewpoint an adequate measure of the relative "efficiency" of farms of various sizes.

IV.

It is now necessary for the writer to state some disclaimers. It is not his intention to claim that data displayed thus far in any way *prove* an inverse relationship between size of farm and productivity per acre. They are cited merely to prove that the general presumption of a highly positive relationship which underlies most land reform discussions is extremely suspect. This presumption is equally evident in the arguments for cooperative farming and in the argument that little can be done to increase the agricultural productivity of a nation of very small farms. Though the data do not prove an inverse relationship between size-of-farm and productivity, nor perhaps even that the opposite may not be true, they certainly throw the burden of proof on the common presumption of a strongly positive relationship. This paper is, therefore, an earnest plea for more and better research on this relationship necessarily so central to all land reform proposals.

A primary limitation of the analysis thus far is that it has been cast in a purely "static" context.[7] The real problems of land reform are those of dynamics. Stated simply, what may be the effects of size of farm upon the rate at which productivity may be increased? It is conceivable that even if size of farm were inversely related to productivity in the static sense, it might yet be positively related to the process of increasing productivity. This is a question upon which the data cited cannot throw direct light.

As a matter of fact, it is precisely in this context that the presumption of a positive relationship between size and productivity had its origin. What western agricultural adviser in India—or what western-educated Indian agriculturist—looking at expanses of Indian land chopped up into tiny holdings and, res-

[7] A crime for which the author would never forgive himself. See, "Some Theoretical Issues in Economic Development," *Journal of Farm Economics*, December 1952, pp. 723–731.

urrecting in his mind's eye the image of Iowa's corn fields stretching endlessly toward the horizon, has not revelled in the thought of what he could do to increase productivity if he could but combine all this land into one large unit? The modus operandi he visualizes for the realization of this dream will depend upon his experiences, his biases and perhaps his political commitments. But, as John Dewey says: "Existence is existence; and facts about it are stubborn." And the stubborn fact in this case is that land will probably respond as well, or better, to the direct ministration of human hands using simple tools as to huge machines designed to meet the requirements of a different situation. And whereas labor is, from a public point of view, cost-free, the machines are very costly indeed.

Although the data as analyzed are static, the relationships revealed are the end products of such dynamics as have existed in the society. Therefore, data from societies whose agriculture have had more dynamics might be even more relevant. It is for this reason that the writer suggested that an examination of (even) American data from this point of view would be informative. Even more useful, perhaps, would be examination of similar relationships in Japan. If data for such countries reveal a negative relationship between size-of-farm and gross value productivity per acre above variable capital costs as the end result of a highly dynamic agricultural development process, then indeed the presuppositions of most land reform discussions—and also of much technical assistance work—need intense re-examination. Again, this paper is a plea for this type of re-examination of American and other farm management data.

The agricultural productivity problem of underdeveloped economies is, at heart, that of the allocation of capital. If the large farms are operationally nothing but agglomerations of small farms, the productivity of farm size is nil. If only managerial responsibilities are affected, the outcome is the net result of two forces working in opposite directions: on one side the presumed advantage of centralized and hence improved management decision-making, on the other side the paired forces of cost of overhead supervision and the reduction of individual incentives. Data cited above give no direct clue to the outcome of this contest. True "diseconomies of scale" could not have begun to operate on farms of the sizes referred to above. In these cases smaller farms produced more per acre than larger farms probably because they used their labor more effectively or used more of it per acre. Overhead costs of supervision and management could not have reached the increasing phase on the larger farms. But successful management of truly large-scale farms (of the cooperative farm or state farm type) is an extremely complex undertaking, much more so than management of comparable size industries.[8] On very large farms great costs of supervision are encountered. True diseconomy of scale, due to overhead costs of supervision and management on such farms, takes a heavy efficiency toll. In private undertakings the incentive to gain directly from one's own effort serves as a powerful spur to work. In a shared-gain enterprise this incentive disappears and must be replaced by other incentives (such as appeals to patriotism) or by compulsions requiring heavy ex-

[8] John M. Brewster, "The Machine Process in Industry and Agriculture," *Journal of Farm Economics*, February 1950; also, John C. Ellickson and John M. Brewster, "Technological Advance and the Structure of American Agriculture," *op. cit.*, November 1947.

penditure on overhead supervisory and enforcement staff.

But from the economic standpoint the greatest practical disadvantage from any kind of shift to large-scale farming would be that it would tie up in relatively unproductive uses capital which would otherwise be highly productive. This would be the very probable result of such a shift as its justification is that it makes possible the introduction of "modern technology." Indian agriculture is desperately starved for capital, to be invested in such uses as minor irrigation systems, soil building systems requiring better seeds, etc., and especially in chemical fertilizers. Small amounts of capital invested in such forms and properly mixed with large amounts of the superabundant labor could produce marvelous results. But capital invested in essentially labor-saving machinery, such as one tends to find on very large farms everywhere, would add little to total production.

Virtually all American agricultural economists, as well as specialists in other fields of agriculture who have been in India a couple of years or more, are impressed with the low level of husbandry practices on the great majority of Indian farms. Our commonly preconceived image of Indian agriculture as teeming with people squeezing every last bit of productivity out of almost hopelessly limited physical resources is inaccurate; it becomes quickly replaced by the ever-present sight of extremely poorly used land. Fields are often very weedy; planting is haphazard with respect to timing, spacing, depth and plant species combinations. Seed bed preparation is usually poor. Such soil and water-conserving practices as contour plowing and planting, terracing, etc., are very rare. Though virtually all the land is extremely deficient in nitrogen, very little use is made on unirrigated lands of legumes in a fertility-building crop rotation system. In areas where water, rather than land, is the principal limiting factor, such water as is available is very inefficiently allocated, usually wastefully squandered on the over-irrigation of a few acres of high water requiring crops. These and other circumstances combine to result in yields ranging perhaps from fifty percent down to twenty percent or less of those which would be obtained from the same physical resources by ordinary "good farming." Small amounts of capital, mixed with large amounts of human effort, invested in overcoming these and similar shortcomings would far outweigh any improvements in productivity which might be achieved through land reform measures—except those which help assure that the farm operator benefits from, and hence has an incentive to bring about, these improvements.

From the standpoint of land reform policy the most important type of very-large-scale farm is the cooperative farm. Apart from the presumption of an advantage due to economy of size (a highly questionable presumption as we have seen) the principal advantage claimed for it is that it provides an effective channel for technological knowledge and mechanism for technological change.[9]

[9] The most impressive case of these "successful" group-farms which I have seen are the so-called "paysannat" of the Belgian Congo. These huge undertakings with 20,000 or so families each are actually not cooperative farms but combination state-and-private farms. They combine in a unique way advantages of large-scale handling of certain key operations, such as plowing and spraying, with an almost unimpaired system of incentives to the individual family to do its work well. Individual farms are lined up in such a way that state-owned large machines can be used for certain key operations while, at the same time, each farmer's produce is sold individually and the family permitted to keep the money left after paying its share (prorated on an acreage basis) of these machinery operation costs. Thus, the farm family's income depends entirely

How effective it is in either capacity has yet to be determined. So-called "experiments" with a few such farms are of highly dubious value as any favorable results can be attributed to the mere fact of concentration of technical knowledge (and often other resources). In an agriculture operating at twenty-thirty percent its reasonable production capacity, such a concentration could be expected to produce highly favorable results almost regardless of the mechanism or channel used. Such a concentration would, of course, be completely impossible were such group farming introduced as a general agricultural policy.

Thus viewed, group farming might best be considered as an alternative to other "extension" techniques and in full view of long-range economic consequences. This recognition might lead to a more energetic quest for more effective extension techniques, applicable under an owner-operatorship mode of farm organization, which should be able to accomplish even more than group farming on the productivity front without the serious long-range economic inefficiency implications. It is the judgment of this writer that the potentials of a virile research-extension organization under owner-operator conditions has by no means been tested in India. At present, agricultural research is still too remote from the every day problems of farmers; and agricultural extension work is too new, too sporadic and especially too loosely connected with research to accomplish much. But the potentialities are tremendous as can be observed here and there where genuinely science-based agricultural extension programs are being carried out.[10] As Rainer Schickele states:

> "The challenge really is: what can be done to accelerate the rate of adoption of better techniques within a predominantly family-type agrarian structure? . . . . I would suggest that if the same people, who could be made available as the managers and technical officers under a system of cooperative farms, would be made available to the same physical area as county agents, along with whatever financial help would be channelled through the cooperatives, the rate of adoption of better production techniques under the present farm-size patterns would not lag behind by many years. Beyond that transitional period the harnessing of the individual initiatives and incentives, and the preservation of the craftsmanship attitude of farmers toward their job, in contrast to an employer-employee relationship, could be expected to surpass, in production performance, the cooperative alternative."[11]

There is one final consideration. This is that massive land reform may be a kind

upon its own efforts. Undoubtedly, the unquestionable increases in yields which resulted from the establishment of these "paysannat" were actually due to the rapid introduction of improved technology on these farms *and not, apparently, to any inherent advantages in large scale operations* as such. One could say with a good deal of accuracy that the remarkable success of these farms is attributable to the fact that this proved to be a highly effective way to do "extension" work. Also, and this is extremely relevant, these farms are in a labor-scarce area. Most of their advantages (such as better insect control) could be achieved in India by hand labor, whereas in the Belgian Congo labor is too scarce for such use. And the problem lying ahead for the paysannat, when existing populations on the farms press too tightly against the rather rigidly set land allotments, would be aggravated manyfold in a country like India with an approximately 1500% greater agrarian population density. The central point is that in Central Africa as in India tremendous productivity increases can be achieved by any device which rapidly upgrades the level of farming practices. The question is whether this device is any better than a good extension program to individual owner-operators and, if so, what are its likely long-run economic consequences.

[10] One factor needing serious consideration—but lying outside the scope of this paper—is that decision-making in a village society is a different process from that in countries characterized by family-farm agriculture. Intense study of the decision-making process in village societies is needed as a prerequisite to the designing of effective extension procedures.

[11] From a letter to the author in review of an earlier draft of this paper.

of shock treatment which may cause rural people, in their new found uncertainty, to be more receptive to new knowledge. A somnolent agriculture, heavily encrusted with centuries-old customary practices, may be jarred loose by the simple *fact* of radical reorganization. But this is basically the cynic's view. Peasant people, at least Indian cultivators, are extremely responsive to suggestions which will really improve their economic lot. As one Indian government worker put it to me: "The cultivator is far more ready to receive good advice than we are to give it to him; he is much more prepared to follow than we are to lead."

In summation, therefore, we are brought to the conclusion that much careful research is needed on the relations of farm size to productivity in both its static and dynamic dimensions and in terms truly relevant to underdeveloped, over-populated societies. Research is also needed into the most effective means of introducing technological changes which will capitalize on abundant labor. To the writer the weight of the evidence thus far is in favor of an effective research-extension program, supplemented by a set of government or cooperative services, in support of a flexible system of small scale, owner-operated farms as the proper goal of land reform policy.

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The Impact of Local Population Pressure on Farm Real Estate Values in California†

By VERNON W. RUTTAN*

THIS ARTICLE reports the results of an attempt to test the hypothesis that variations in farm real estate values among California counties reflect the impact of variations in population pressure among California counties.

A common assumption of studies dealing with factors which affect farm land values has been that changes in farm land values over time intend to reflect changes in the demand for farm products while geographic differences in farm land values reflect differences in the productivity of land.[1]

In recent years, however, there has been increased speculation that the continued rise of farm real estate prices in the face of a declining or stable value of farm output reflects the effect of nonfarm influences acting directly on the land market rather than through the demand for farm products.[2]

The population explosion of recent decades has been a major factor in forcing this shift in emphasis. In California the rapid displacement of "ranches by ranch houses" in a region characterized by a highly articulate agricultural community has generated considerable discussion of the impact of population pressure on the farm real estate market.[3]

Direct competition between farm and nonfarm uses for agricultural land is not the only factor that gives rise to higher land values in the vicinity of population centers. Both agricultural location and development theory provide a clear basis for expecting that urban-industrial development will exert a differential impact on agricultural land values through the factor and product markets.[4] In a pre-

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[1] See, for example, Edward F. Renshaw, *Toward Responsible Government* (Chicago, Illinois: Idyia Press, 1957), chapter vii; also, "Cross-Sectional Pricing in the Market for Irrigated Land," *Agricultural Economics Research*, January 1958, pp. 14–19; H. E. Selby, "Factors Affecting the Value of Land and Water in Irrigated Areas," *The Journal of Land & Public Utility Economics*, August 1945, pp. 250–258.

[2] According to Scofield, "the propensity of agricultural economists to limit their analysis of the land market to those economic forces that operate within the agricultural sector . . . has hampered a fuller understanding of past and current trends. With the growing interdependence of farm and non-farm economies . . . the conventional compartmentation has become more convenient than realistic." William H. Scofield, "Prevailing Land Market Forces," *Journal of Farm Economics*, December 1957, p. 1500. The importance of nonfarm influences is also stressed in Frederic O. Sargent, "Land Market and Price Analysis in an Agro-industrial Economy," *The Appraisal Journal*, October 1959, pp. 359–363.

[3] For a discussion of the impact of urban pressures on land in California see, Howard F. Gregor, "Urban Pressure on California Land," *Land Economics*, November 1957, pp. 311–325; James Gillies and Frank Mittelbach, "Urban Pressures on California Land: A Comment," *Land Economics*, February 1958, pp. 80–83; also, Howard F. Gregor, "Urban Pressures on California Land: A Rejoinder," *ibid.*, pp. 83–87; George Alcorn, et al, "Is Agricultural Zoning Necessary in California." *Transactions of the Commonwealth Club, California*, Volume 52, No. 4, San Francisco, March 17, 1958; Los Angeles County Regional Planning Commission, *Exclusive Agricultural Zoning; Preliminary Study Material* (undated mimeo).

[4] August Losch, *The Economics of Location*, (New Haven, Connecticut: Yale University Press, 1954), pp. 26–63; Edgar S. Dunn, Jr., *The Location of Agricultural Production*, (Gainesville, Florida: University of Florida Press, 1954), pp. 6–43. The negative relationship between distance from urban centers and land rents which Dunn demonstrates in his

vious study, it was shown that urban-industrial development exerted a direct impact on farm income through local factor and product markets.[5]

I

The empirical test of the hypothesis involved the use of a cross sectional single equation regression model linear in the logarithms (curvalinear in natural numbers). Six variables were employed in the analysis: *The dependent variable:* X_1—the value of farm real estate (land and buildings). *Five independent variables:* X_2—Irrigated cropland harvested, X_3—Nonirrigated cropland harvested, X_4—Irrigated pasture, X_5—Nonirrigated pasture, X_6—Total county population. Counties were employed as the units of observation. The data are from the *Census of Agriculture and Population.*[6] The test was carried out for three different census years, 1939, 1949 and 1954.

The use of regression models in the analysis of real estate markets has, until recently, been relatively neglected following a number of interesting applications in the late 1920's and early 1930's.[7] In recent literature Renshaw is quite optimistic regarding the potential usefulness of regression models to investigate land market behavior. Milliman and Sargent do not share this enthusiasm. These positions may not, however, be as inconsistent as they appear on the surface. It seems quite likely that it will never be possible to incorporate all of the subjective elements which enter into the func-

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argument would be even more pronounced if his rent function were expanded to include the effect of farm inputs shipped from urban centers to production areas.

Schultz has combined the implications of agricultural location and development theory into a set of three hypotheses: (1) Economic development occurs in specific locational matrix. (2) These locational matrices are primarily industrial urban in composition. (3) The existing economic organization works best at or near the center of a particular matrix of economic development and it also works best in those parts of agriculture which are situated favorably in relation to such a center. T. W. Schultz, *The Economic Organization of Agriculture* (New York, New York: McGraw-Hill, 1953), p. 147.

[5] Vernon W. Ruttan, "The Impact of Urban-Industrial Development on Agriculture in the Tennessee Valley and the Southeast," *Journal of Farm Economics,* February 1955, pp. 38–56.

[6] The sources of data for X_1, X_2, X_3, X_4 and X_5 are: *1939:* United States Bureau of the Census, *Sixteenth Census of the United States: 1940 Agriculture,* Washington, D. C.: Government Printing Office, 1942, Volume I (First and Second Series State Reports), Part 6 (Statistics for Counties), pp. 675–784. *1949:* United States Bureau of the Census, *United States Census of Agriculture: 1950,* Washington, D. C.: Government Printing Office, 1952, Volume I (Counties and State Economic Areas), Part 33 (California), pp. 1–295. *1954:* United States Bureau of the Census, *United States Census of Agriculture: 1954,* Washington D. C.: Government Printing Office, 1956, Volume I (Counties and State Economic Areas), Part 33 (California), pp. 1–262. Data on the total value of land and buildings are not directly available for 1949 and 1954. The county totals employed in this study were computed by multiplying the reported average values of land and buildings per farm by the number of farms in each county.

The sources for data for X_6 are: *1939:* United States Bureau of the Census, *Sixteenth Census of the United States: 1940 Population,* Washington, D. C.: Government Printing Office, 1943, Volume II (Characteristics of the Population), Part I (United States Summary and Alabama-District of Columbia), pp. 513–689. *1949:* United States Bureau of the Census, *Seventeenth Decennial Census of the United States: 1950, Population,* Washington, D. C.: Government Printing Office, 1952, Volume II, (Characteristics of the Population), Part 5 (California), pp. 1–483. *1954:* County population estimates by the Bureau of the Census are not available for 1955. Data for 1950 was used for the 1954 analysis.

Inter-census population estimates have been made for California counties. Small area population estimation procedures for inter-census years leave much to be desired, however. See Henry S. Shryock, Jr., "Development of Post Censal Population Estimates for Local Areas," *Regional Income,* (Princeton, New Jersey: Princeton University Press, 1954 (Conference on Research in Income and Wealth), Volume 21, pp. 377–390. See also the comments by Webb and Corry.

[7] For a summary of the literature on the use of regression models in land market research, see Edward F. Renshaw, "Scientific Appraisal," *National Tax Journal,* December 1958, pp. 314–322. This literature is also discussed briefly in Edward F. Renshaw, "Models of the Land Market: A Note," *Journal of Farm Economics,* February 1960; J. W. Milliman, "Land Values—A Further Comment," *Journal of Farm Economics,* February 1960; Frederic O. Sargent, "Land Market and Price Analysis in an Agro-Industrial Economy," *The Appraisal Journal,* October 1959, pp. 359–363.

tioning of land markets into quantitative models which can be statistically implemented. On the other hand, such models can provide effective tests of the quantitative significance of those relationships which are hypothesized to play dominant roles in the functioning of land markets.

Population pressure is typically measured by a ratio such as population per square mile or population per acre of arable cropland. The ratio is used to standardize for differences in the area of the units being compared. In this study both population and land are explicitly introduced into the model. This permits standardization for land area without obscuring the effect of each variable. Four different land variables are entered in order to reflect, in a limited way, the wide diversity of agricultural land use among counties in California.[8] It seems likely, for example, that a given population level would have a different impact on farm real estate values in an area where agricultural land use was heavily concentrated in dryland cropland or grazing than in any area characterized by the production of intensive irrigated crops.

The studies of the late 1920's and early 1930's typically assumed arithmetically linear relationships. In this study a particular nonlinear relationship (linear in the logarithms) between farm real estate values and the several independent variables is assumed. This is the simplest functional form which will permit the kind of interaction between differences in population and agricultural land use suggested above.[9]

Ideally a curve which could reflect both increasing and decreasing marginal price response (or value response for a particular geographic area) to population differences should be used. This would permit the function to reflect any increasing response of farm real estate price (or value) which might characterize a period of urban "sprawl" around an area's major population center and a decreasing price response during a subsequent period of "consolidation" after the urban center occupies a major portion of the area's available land.

Functional forms which meet this requirement, however, use more degrees of freedom for any given number of independent variables than the equation employed in this study. Because of the limited number of observations available, it is necessary to substitute a certain amount of computational "expediency" for estimation "precision." If this is a "bad" decision, the effect will be detected in land value estimates for the low population counties which are biased downward.

A further potential limitation should also be noted. Limitations in the use of cross section models to derive inferences to what are essentially time sequence phenomena is increasingly noted in current literature.[10] This defect is partially

[8] "The average value of all farmland in California, which was estimated at $282.00 per acre as of March 1, 1958, is a composite of many type and grades of land. Values range from less than $50 per acre for some grazing land to more than $5,000 per acre for certain irrigated orchards." *The Farm Real Estate Market*, United States Department of Agriculture, Agricultural Research Service, 43–74, May 1958, p. 7.

[9] Although Renshaw converts the population variable into the logarithm of population in the land market model presented in Appendix B of *Toward Responsible Government*, no rationale is offered. Indeed he seems somewhat surprised to find population significantly associated with value of irrigated land and buildings.

[10] See particularly, Edwin Kuh, "The Validity of Cross-Sectionally Estimated Behavior Equations in Time Series Applications," *Econometrica*, April 1959, pp. 197–214. Also Edwin Kuh and John Meyer, "How Extraneous are Extraneous Estimates," *Review of Economics and Statistics*, November 1957, pp. 380–93.

TABLE I—REGRESSION ANALYSIS OF FACTORS AFFECTING THE VALUE OF FARM REAL ESTATE IN CALIFORNIA, ALL COUNTIES: 1939, 1949 and 1954.

	Coefficients of the regression equations					
	Equation 1			Equation 2		
	1939	1949	1954	1939	1949	1954
a_0—Constant term (in Log_e)	4.7394	5.3699	5.6251	4.5950	4.8517	5.2787
X_2—Irrigated cropland (acres)	.3014[a] (.0695)	.3127[a] (.0732)	.3274[a] (.0690)	.2111[a] (.0453)	.2219[a] (.0472)	.2843[a] (.0489)
X_3—Irrigated pasture (acres)	−.1122[b] (.0476)	−.1636 (.1033)	−.0911 (.1029)			
X_4—Nonirrigated cropland (acres).	.1860[a] (.0640)	−.0286 (.0438)	−.0065 (.0460)			
X_5—Nonirrigated pasture (thousands of acres)	.1706[a] (.0355)	.4221[a] (.1124)	.2717[a] (.1054)	.2223[a] (.0365)	.3323[a] (.0968)	.2355[a] (.0891)
X_6—County population (thousands of people)	.4017[a] (.0622)	.4552[a] (.0722)	.4150[a] (.0673)	.5704[a] (.0627)	.5018[a] (.0631)	.4353[a] (.0607)
Sum or regression coefficients (independent variables)	.9476	.9974	.9164	1.0038	1.0560	.9556
Coefficient of determination—R^2 ..	.8813	.7946	.7839	.8137	.7824	.7801
Standard error of estimate (in Log_e)—S	.4156	.5613	.5494	.5095	.5652	.5423

[a] Significant at the .01 level.
[b] Significant at the .05 level.

overcome in the present analysis by the opportunity to examine the cross sectional spatial relationships in three different years—1939, 1949 and 1954.

II

The results of the analysis, *for California as a whole,* are presented in Table I.

It is clear from the high coefficients of correlation that variations in the factors included in Equation 1 are associated with a fairly large share of the total variation in the value of farm real estate among California counties. Furthermore, the results are clearly consistent with the hypothesis that variations in farm real estate values among California counties are positively associated with population pressure.

Equation 1 does not, however, present an entirely satisfactory basis for examining the relationship between farm real estate values and population pressure. Several of the regression coefficients are not significantly different from zero at either of the .01 or .05 significance levels (on the basis of the test for the individual coefficients).

Confidence in the validity of the model could be strengthened if it can be modified to include variables which possess the desired level of significance during all three periods studied.[11] In Equation 2, irrigated pasture (X_3) and nonirrigated cropland (X_4) were dropped from the analysis. The regression coefficients of the remaining three variables—irrigated cropland (X_2), nonirrigated pasture (X_5)

[11] The exact meaning of the standard tests of significance of the individual regression coefficients is not clear when the observations approximate the entire universe. Nevertheless, comparisons of a regression coefficient with its standard error does provide at least an intuitive guide to the reliability of the coefficient.

and county population (X_6)—are significant at the .01 levels for all three years.

The material presented in Table I can be interpreted as follows: (1) Variations in irrigated cropland, nonirrigated pasture, and county population (as measured by the coefficients of determination—R^2) were associated with 75 to 80 percent of the total variation in farm real estate values among California counties during each of the three years included in this study. (2) Between 1939 and 1954, the impact of population pressure on farm real estate values has declined significantly. A 10 percent change in county population resulted in a 5.7 percent change in the value of farm real estate in 1939 and a change of about 4.5 percent in 1954. The coefficient for irrigated cropland and nonirrigated pasture did not change significantly during the period studied. (3) By these same measures, total county population was significantly more important than irrigation in accounting for variations in farm real estate values among California counties in all three of the years included in the analysis.

There are, of course, important physiographic and economic differences among California counties that are not directly measured by the variables included in this analysis. The question arises, therefore, whether greater precision could not be introduced into the analysis by segmenting the state into at least two groups of counties selected in some manner to increase the internal homogeneity of each group. An attempt was made to achieve greater uniformity by grouping counties according to the number of acres of irrigated cropland harvested. There were 25 counties in Southern California and the San Joaquin and Sacramento Valleys in which more than 50,000 acres of irrigated cropland were harvested in 1954, and 26 other counties in California in which less than 50,000 acres of irrigated cropland were harvested in 1954.[12] Most of California's major population centers are located in the major irrigation counties.

The results of the statistical analysis for the two groups of counties are presented in Table II.[13] In both the major and the limited irrigation counties, the results are clearly consistent with the hypothesis that variations in farm real estate values among California counties are positively associated with variations in county population.

When evaluated against the objective of identifying models which give satisfactory performance in each of the three years included in the study the statistical analysis for the two groups of counties was only partially successful, however. For the limited irrigation counties the model of Equation 6 is quite satisfactory for all three years. For the major irrigation counties the model of Equation 5 is satisfactory only for 1949 and 1954.

It is possible, of course, that a more meaningful grouping of counties might be found. An attempt was made to determine if any "natural" groupings could

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[12] This classification should be qualified as follows: Modoc County with 89,038 and Siskiyou County with 55,275 acres of irrigated cropland in 1955 are included among the limited irrigated counties because of similarity in many respects to other Northern California counties included among the limited irrigation counties. There are a total of 58 counties in California. San Francisco County was omitted from the analysis because it is a completely urban county. In addition, Placer and El Dorado; Alpine, Amador, and Calaveras; Tuolumne and Mariposa; Del Monte and Humboldt, and Mono and Inyo Counties were grouped because of the limited agriculture in each of these counties. This reduced the number of units dealt with in the analysis from 58 to 51.

[13] Models including the independent variables X_3 (irrigated pasture) and X_4 (nonirrigated pasture) were also computed but are not shown. X_3 and X_4 were generally not significant at the .05 percent level.

be identified by ranking (from high positive to low negative) counties according to the percentage difference between the actual and predicted value of the dependent variable (value of land and buildings). No such "natural" grouping was observed. In the highest third (high positive prediction errors) are such diverse counties as Siskiyou, Sacramento and Los Angeles. In the lowest third are such diverse counties as Del Monte-Humbolt, Santa Clara, Imperial and Orange. Furthermore, there is considerable stability in the ranking of the counties over the period studied. Of the 17 counties in the third with the highest (positive) prediction errors, thirteen were also in the same group in 1939. Of the 17 counties in the lowest third (high negative prediction errors) 12 were in the same group in 1939.

It is clear, however, that the major irrigation counties tend to be concentrated in the middle third—the group with the smallest perdiction errors. Thus, prediction errors tend to be smaller for the

TABLE II—Regression Analysis of Factors Affecting the Value of Farm Real Estate in California, Major Irrigation Counties and Limited Irrigation Counties: 1939, 1949 and 1954.

	Equation 3			Equation 5		
A. Major Irrigation Counties	1939	1949	1954	1939	1949	1954
a_0—Constant term (in Log_e)	5.8538	6.3204	5.1306	9.1445	6.5118	6.4167
X_2—Irrigated cropland (acres)	.1924[b] (.1184)	.2924[a] (.0773)	.4542 (.0815)	−.0268 (.2113)	.3010[a] (.0759)	.3328[a] (.0796)
X_5—Nonirrigated pasture (thousands of acres)	.2106[a] (.0287)	.0597 (.0743)	.0212 (.0725)			
X_6—County population	.3761[a] (.0685)	.3752[a] (.0482)	.3217[a] (.0510)	.4667[a] (.1243)	.3871[a] (.0455)	.3730[a] (.0474)
Sum of regression coefficients (independent variable)	.7791	.7274	.7971	.4399	.6881	.7658
Coefficient of determination—R^2 ..	.8343	.8187	.7802	.4100	.8131	.7794
Standard error of estimate (in Log_e)	.3676	.3261	.3523	.6679	.2703	.2826
B. Limited Irrigation Counties	Equation 4			Equation 6		
a_0—Constant term (in Log_e)	4.6921	4.4306	5.2982	5.3151	4.8227	5.8196
X_2—Irrigated cropland (acres)	.0709[b] (.0694)	.0558 (.0836)	.0805 (.1040)			
X_5—Nonirrigated pasture (thousands of acres)	.3715[a] (.1011)	.6006[a] (.1402)	.5071[a] (.1435)	.3767[a] (.1011)	.6183[a] (.1359)	.5410[a] (.1354)
X_6—County population	.6335[a] (.0945)	.5896[a] (.0990)	.5066[a] (.1007)	.6288[a] (.0945)	.5930[a] (.0976)	.5153[a] (.0991)
Sum of regression coefficients (independent variable)	1.0759	1.2460	1.0943	1.0055	1.2113	1.0563
Coefficient of determination—R^2 ..	.7548	.7281	.6622	.7426	.7224	.6525
Standard error of estimate (in Log_e)	.5108	.6200	.6270	.5113	.6121	.6213

[a] Significant at the .01 level.

[b] Significant at the .05 level.

major irrigation counties than the limited irrigation counties regardless of whether Equation 2 (for all counties) or Equation 5 (for major irrigation counties) and 6 (for limited irrigation counties) is employed.

Two attempts were made to determine if the hypothesized relationship—linear in the logarithms—adequately describes the relationships among the variables included in the several models presented in Tables I and II. The first attempt involved comparison with the results obtained from an arithmetically linear model. The same independent variables were associated with a much smaller percent of total variation in farm real estate values when an arithmetically linear regression model was employed. Coefficients of determination (R^2) in the neighborhood of .50 were typically obtained. The second attempt involved plotting the estimated values of the dependent values against the actual values of the dependent variables on double log paper. The results were clearly consistent with a relationship linear in the logarithms for Equations 2, 5 and 6 for all three years. There would seem, therefore, to be little basis for questioning the form of the relationship used in the regression analysis.

III

In summarizing the results of this study, it seems desirable to emphasize three points: (1) Each of the models examined in this section are consistent with the hypothesis that variations in farm real estate values are positively associated with variations in population pressure as measured by total county population. (2) The results of the analysis are consistent with the assumption that the relationships among the variables included in the analysis are linear in the logarithms. (3) The magnitude of the unexplained variation in farm real estate values among California counties (as measured by the coefficient of determination and the standard errors of estimate) means that the models employed in this paper are still considerably less than adequate when evaluated against the objective of a complete model of the farm real estate market.[14] The analysis does emphasize the important role which population pressure must play in any such complete model.

[14] The most obvious step in attempting to develop an improved model would be to introduce an indicator or indicators of yield potential of the type employed by Renshaw in "Cross-Sectional Pricing . . . ," *op. cit.*

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The Appalachian Region: A National Problem Area†

By DAVID A. GROSSMAN *and* MELVIN R. LEVIN*

FOR MANY YEARS the Appalachian Region[1] has been recognized as one of America's major problem areas. In times of general economic distress the people of the Appalachians have been more sorely afflicted than have the residents of most other parts of the nation. Even when the national economy has enjoyed widespread prosperity the Appalachian Region has been beset with economic hardship. These conditions have been caused in whole or in part by declines in several of the region's principal economic activities, especially agriculture and coal mining.

This article surveys recent population and economic trends in the Appalachian Region, analyzes the area's assets and liabilities for economic development and recommends lines of action to be followed in attempts to redress the area's severe imbalance between labor force and job opportunities.

Population Characteristics and Trends

As of 1959 it was estimated that the Appalachian Region contained some 9.8 million people, or over 5 percent of the national population. Despite the fact that it has been characterized by birth rates somewhat higher than the national average, the region's population declined slightly between 1950 and 1959, compared to a 17 percent gain for the nation as a whole. This decline was due to very heavy net outmigration, amounting to an estimated 1.7 million persons in the nine-year period.[2]

The Appalachians contributed an average of more than 150,000 persons a year to other parts of the nation between 1950 and 1959, two-thirds of whom were probably of working age. In cash terms, each working age migrant carried with him over $10,000 in total public and private "rearing" costs, most of which was derived from regional sources. On this basis the Appalachian Region may be contributing as much as a billion dollars per year in trained or trainable human capital to urban centers in the North Central and Mid-Atlantic states. It must also be pointed out, however, that migrants make a significant contribution to the regional economy: in the absence of migration the region's population would rise rapidly and its per capita incomes would fall below their already depressed level. Also, the migrants who are able to better themselves economically in the ur-

† This article is based largely on a study prepared by the authors for the Maryland Department of Economic Development, *The Appalachian Region: A Preliminary Analysis of Economic and Population Trends in an Eleven-State Problem Area.* May 1960. The study was prepared to serve as reference material for the Governors' Conference on the Appalachian Region, held at Annapolis, Maryland, May 20, 1960. The recommendations in this article are those of the authors and do not necessarily reflect the opinions of the Maryland Department of Economic Development.

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[1] The Appalachian Region, as defined for the purposes of this article contains 260 counties lying in eleven states; the total area included is 130,000 square miles with a population of almost 10 million. It includes substantially all of the area that has generally been defined as the "Southern Appalachians" (most notably in the Bureau of Agricultural Economics study, *Economic & Social Problems of the Southern Appalachians,* United States Department of Agriculture Miscellaneous Publication #205, Washington, D. C.) together with the mountainous central portions of Pennsylvania and the southern tier counties of New York State.

[2] The 1959 population figure is based on individual county estimates by *Sales Management.* Preliminary data from the 1960 *United States Census of Population* appear to bear out the reliability of these estimates. The outmigration estimate is by the authors and assumes natural increase from 1950 to 1959 equal to 18 percent of the 1950 population.

ban centers outside the region frequently continue to contribute to the welfare of their families who remain in the Appalachians.

Only 28 percent of the region's population lived in metropolitan areas in 1950, compared to 55 percent in the nation. However, while the 1950 Census indicated that some 64 percent of the region's population was rural, as compared to 36 percent in the nation, the linear pattern of development common to this mountainous region tends to create urban densities in mining districts and, in some cases, even in rural areas.[3]

Educational levels in the Appalachian Region are well below the national average. In 1950 the adult population in most counties in the region had median levels of schooling about two years below the national median of 9.3 years. Regional levels of per capita income are also below those of the United States as a whole and generally below those of the states in which the region lies. Estimates of 1959 per capita incomes in the region indicate that only in the few urban counties did incomes exceed $1,000 annually.[4] A prime cause of substandard per capita incomes in the region is the low rate of labor force participation. Only about 50 percent of the region's population of labor force age is estimated to be in the labor force, compared to an average of 57 percent for the nation as a whole.

TABLE I—PERCENT OF TOTAL EMPLOYMENT (1959) AND PERCENT CHANGE IN EMPLOYMENT (1950 THROUGH 1959) BY MAJOR CATEGORIES: APPALACHIAN REGION

Category	Percent of Total Employment, 1959	Percent Change in Number of Jobs 1950–59[6]
Agriculture[1]	12	−25
Mining[2]	5	−60
Manufacturing[3]	26	+ 5
Services and Trades[4].	48	+ 5
Self-Employment[5] ...	9	n/a
TOTAL	100	+ 1[7]

Source:

[1] The total of 484,000 persons employed in agriculture in the region in 1950 (*County and City Data Book*, 1952) was first reduced by 22 percent, the decline which characterized United States agricultural employment from 1950 to 1959 (Washington, D. C.: United States Bureau of Labor Statistics, *Employment and Earnings*, March 1960) and then further reduced by 71 percent to exclude part-time, residential and commercial farms with annual sales under $2,500 (this was the nation farm pattern in 1954). Thus the estimate tends to eliminate most of the persons who are underemployed in agriculture.

[2] The 360,000 miners in the region in 1950 (*County and City Data Book*, 1952) were reduced by about 60 percent, the United States decline in anthracite and bituminous coal mining employment in the period 1950–1959 (*Statistical Abstract of the United States, 1959*, Washington, D. C.: Government Printing Office; and *Employment and Earnings*, 1959).

[3] The figure of 841,000 manufacturing employees in the region in 1954 (*County and City Data Book*, 1956) was increased by a little over 1 percent, the nationwide increase in manufacturing employment from 1954 to 1959 (*Employment and Earnings*, 1959).

[4] Employment in this category was estimated as equal to 160 percent of combined manufacturing and mining employment. If anything, this estimate may be high, even compared to the United States figure of 209 percent for the same relationship, in light of the 1959 ratios of 138 percent for West Virginia, 140 percent for Pennsylvania and 127 percent for North Carolina (*Employment and Earnings*, 1959).

[5] This residual group was estimated to be equal to about 11 percent of the total of the preceding employment categories, the same relationship which it is estimated to have had in the nation as a whole in 1959 (*Employment and Earnings*, 1959).

[6] 1950 data from *County and City Data Book*, 1956; 1959 data estimate as indicated above.

[7] Excludes change in self-employed category.

[3] The authors are indebted to A. J. Gray of the Tennessee Valley Authority for this point. In a recent letter he stated: "I would take the view that the mine villages along the narrow valleys are really urban communities. The fact that they are unorganized and have few services does not change this basic assumption. It merely indicates a failure of the states to require proper standards for health, education, and other essentials for urban living. That these standards are not required does not make them any less urban."

[4] Estimates of per capita income are for "effective buying income" by *Sales Management*.

This disproportionate figure is especially great for women: less than a quarter of the region's women aged 14 and over are estimated to be in the labor force, compared to 35 percent in the nation.[5]

Economic Structure and Recent Trends

In national terms the chief economic importance of the Appalachian Region is as a mining and manufacturing area. Virtually all of the nation's anthracite coal and over half of its bituminous coal is produced here. The Appalachians also occupy an important position in the nation's manufacturing pattern, with roughly 5 percent of the nation's manufacturing jobs. In other respects the Appalachians perform a less significant function. The region's undersized and undercapitalized farms contain an estimated 6 percent of United States farm employment but produce only about 3 percent of the total value of farm products.[6]

The region's employment structure and recent job trends are summarized in Table I which shows that the dominant element in the economy is manufacturing, which provides roughly six times as many jobs as coal mining and almost eight times as much full-time, remunerative employment as farming. Between 1950 and 1959 six jobs were lost in coal mining and farming for every job gained in manufacturing.

A quarter of the region's population and over one-third of its manufacturing employment is contained in its twelve metropolitan areas which provide, on the average, about 300 non-farm jobs per 1,000 population. In contrast, the remaining areas of the region contain only about 220 non-farm jobs per 1,000 population. This wide difference, considered in conjunction with the fact that wages tend to run substantially higher in cities as compared to small towns and farm areas, furnishes part of the explanation for a continuing population drift away from the region's rural counties toward its urban centers.

[5] 1959 labor force estimate derived from a total population estimate of 9,830,000 for the counties in the Appalachian Region (*Sales Management*, May 1959) of whom 70.5 percent are estimated to be 14 years of age or older, based on a weighted average of Bureau of the Census estimates for the eleven states in the region (*Current Population Reports*, Series P-25, No. 214). Of this group, 50 percent are estimated to be in the labor force. The 50 percent labor force participation rate assumes equal proportions of men and women in the population with respective participation rates of 77 percent and 23 percent. These rates are an estimated average of the 1950 rates in the eleven states in the region (e.g., West Virginia rates were 75 percent and 20 percent, Tennessee rates were 77 percent and 26 percent).

[6] See Table I for source of employment estimates. Value of farm products derived from 1954 *United States Census of Agriculture*.

TABLE II—LABOR FORCE AND EMPLOYMENT COMPARISON, APPALACHIAN REGION, 1959

LABOR FORCE[1]		EMPLOYMENT[2]	
Category	Number	Category	Number
		Agriculture	110,000
Total population	9,830,000	Mining	140,000
Under age 14	−2,890,000	Manufacturing	850,000
Over age 14, but	−3,470,000	Trades and Services	1,540,000
not in labor force		Self-Employed	290,000
TOTAL	3,470,000	TOTAL	2,930,000

[1] See footnote 5 in text for basis for labor force estimates.
[2] See footnotes in Table I for basis of employment estimates.

The Regional Job Deficiency

In order to place the Appalachian employment problem in perspective, a tentative balance sheet has been prepared, indicating the relationships between employment, labor force and population. Table II illustrates the labor force/employment balance estimated for the Appalachian Region in 1959. The employment estimates are for all jobs, full or part-time, except that the agricultural estimate includes only persons who have a reasonable chance of earning an adequate living from farming; thus the nonagricultural employment estimates (especially those for mining and the self-employed) conceal a significant amount of part-time employment. These estimates leave much to be desired since the detailed 1960 census data which would permit an accurate analysis are not yet available.

Table II indicates that as of 1959 over half a million additional jobs would be required to close the gap between labor force and available jobs in the Appalachian Region. This estimate is based on the region's estimated current rates of labor force participation; if the regional labor force participation rates were equal to the national average, an estimated 80,000 more men and 400,000 more women would be included in the labor force, thus increasing the number of jobs needed to balance employment and labor force to over one million.

It is possible to make a rough overall estimate of the job needs of the Appalachian Region in terms of the backlog of need that existed in 1960 and the additional jobs which will be needed in the next ten years. However, in presenting the estimate shown in Table III, a word of caution is advisable: while it is believed that the estimates are accurate on an order-of-magnitude basis, no claim to precision is made. The sections which follow examine the assets and liabilities of the Appalachian Region for achieving a substantial increase in its employment capabilities and closing or reducing the gap between jobs and labor force.

Obstacles to Economic Growth

The chief obstacles to economic expansion in the Appalachian Region revolve around six major factors:

Unfavorable Psychological Attitudes. The region has been subjected to a prolonged depression which has tended to develop characteristics inimical to economic expansion. Outmigration of talented, energetic younger people, the sense of frustration arising from the long series of mine shutdowns and the steady drift away from marginal farms have created a mood of apathy and despair. Equally serious from the point of view of future growth is the image of the region in other parts of the nation: it is seen as a collection of mining hamlets and hill farms rather than as a major manufacturing area; its cities are reputed to be unattractive; its flood problems severe; its labor force untrained and hard to handle.

Retarding Effects of Declining Industries. The region's dependence on economic activities with steadily declining manpower needs has seriously handicapped efforts to strengthen its economy. Jobs in mining, farming, railroading and in certain types of manufacturing have disappeared almost as fast as new jobs can be created in other sectors of the economy. One result has been to throw onto the labor market large numbers of superannuated, unskilled or otherwise difficult-to-employ farm and mine workers.

Obsolescent Community Facilities. In many of the region's farming and mining areas important public facilities and serv-

TABLE III—ESTIMATED JOB DEFICIT, 1959, AND ESTIMATE OF ADDITIONAL JOBS NEEDED IN THE DECADE 1960–1970: APPALACHIAN REGION

	Approximate Number of Jobs Needed	
ESTIMATED JOB DEFICIT, 1959		
1. To provide employment for persons in the labor force who are wholly unemployed or are under-employed in agriculture	500,000	
2. To provide the additional employment needed if the region is to achieve national rates of labor force participation	500,000	
3. To provide additional jobs to eliminate under-employment in mining, manufacturing, trades and services and self-employment	100,000	
ESTIMATED JOB DEFICIT, 1959		1,100,000
ESTIMATE OF ADDITIONAL JOBS NEEDED IN THE DECADE 1960–1970		
4. To replace employment losses which can be anticipated in declining activities, especially mining, farming and some manufacturing activities	100,000	
5. To provide employment for at least half of the young people coming into the labor force in the period 1960–70 (less the number of jobs that will be made available by persons retiring from the labor force)	250,000	
6. To provide employment for a minimum of previous outmigrants or long-range commuters	80,000	
7. To account for jobs which must go to immigrants from other areas because of special skill or other requirements	20,000	
ADDITIONAL JOBS NEEDED, 1960–1970		450,000

ices are either substandard or non-existent, residential and commercial structures are dilapidated and community planning efforts have not been in evidence. Education and health levels are low, particularly in the agricultural areas. Lacking the basic preparation necessary for technical training, many of the region's residents have been relegated to marginal, low-paying jobs in factories and service establishments.

Problems Created by Topography. Definite handicaps to economic development are created by the region's topography. A number of the area's communities possess only a limited number of developable sites for industrial activity and other urban uses since much of their land area is either extremely hilly or subject to periodic flooding. Flood control is costly to achieve, partly because of the scarcity of level land beyond the flood plains of the region's numerous rivers and partly because physical measures (dams and levees) are not always economically feasible in headwater areas where rivers split into a number of small tributaries. Portions of the region also lack a dependable year-round supply of fresh water for domestic and industrial purposes. Road building is far more costly in the Appalachians than in more level areas and the choice of routes is restricted by topographic considerations.

In consequence, the region has traditionally been more difficult and costly to penetrate than has adjoining lowland areas.

Competition from Other Areas. During the past decade, competition among states and communities for new plants has been growing more intense. Under modern technological and market conditions a factory may have a choice of dozens of locations hundreds of miles apart in which it can operate profitably. The problem is further complicated for a job-deficit area like the Appalachians by the fact that the nation's manufacturing industry has reduced rather than expanded its manpower requirements in the past seven years.

Errors in Policy. Serious miscalculations or misdirections in community and state policy have retarded economic development of the region. Mineral resources might have been taxed more heavily in periods of mining prosperity to provide adequate public services and facilities to help finance the transition to a new economic base. Agriculture, forestry and mining might have been better controlled to guard the region's soil and tree resources. Also, far too large a proportion of the region's scarce resources have been directed toward attracting weak, low-wage oriented industries such as textiles and apparel and to fruitless, costly attempts to stem the downward trend in coal and farm activities.

Assets for Economic Growth

Assets for economic development are frequently the obverse side of handicaps. In fact, it is the recent progress being made in overcoming the disadvantages of the Appalachian Region which represents the area's greatest asset for economic expansion.

Improving Atmosphere for Growth. In recent years some progress has been made in altering the region's psychological outlook and in changing the unfavorable reputation it has enjoyed. The fact that, in parts of the region, community resources have been effectively mobilized for civic renovation and to attract new industry demonstrates that there is vigor and leadership available.

Worst of Job Declines Has Already Occurred. The impact of declining industries has largely spent its force in many Appalachian communities. Mechanization has reduced coal mine employment to minimal levels and a heavy reduction in agricultural jobs has taken place in the past decade. Future losses from these two industries are likely to be less massive.

Gains in Community Facilities and Services. Progress in improving community facilities and services has been apparent in a number of Appalachian areas. A promising start has also been made in city and regional planning and urban renewal and in expanding municipal water and sewerage facilities, often with the help of federal aid programs.

Advances in Conservation and Flood Damage Control. The region has become more attractive in recent years, partly because of efforts to attack stream pollution problems, reforestation and creation of new lakes. Reservoir dams and other protective measures have made inroads into the serious flood problems which afflict parts of the region and have provided the water areas needed as a basic resource for an expanded tourist industry.

Improved Vehicular Access. A major advance in the region's transportation network will be provided by the Interstate Highway system. By the 1970's, the region's major urban areas should be

connected to each other and linked to the rest of the nation by all-weather, limited-access expressways. The significance of this development in destroying both the real and the psychological isolation of the Appalachian Region cannot be overemphasized.

Industrial Spillover. The strengthening of the region's ties with surrounding market and manufacturing centers by virtue of an improved highway system should accelerate the "spillover" of manufacturing operations on the part of certain industries: much of the region is located within overnight trucking distance of the nation's major northeastern manufacturing belt and the southeastern concentration of manufacturing activity.

Effect of Highways on Tourism. The improved attractiveness for manufacturing operations implicit in the development of new highways will have similar stimulating effects on the region's growing tourist industry, as well as on certain of its agricultural operations such as dairying.

Resource-Oriented Industries. Economic activity should continue to be generated by the region's important natural resources. The combination of mineral resources and good water and rail transportation has helped to stimulate growing chemical and aluminum production. In the Ohio & Kanawha Valleys the forest reserves have been important to wood-using operations and its farm produce has been the basis of a large food-processing industry. In a direct sense the region's tourist industry is also based on the presence of impressive natural resources.

More Effective Development Action. One of the most hopeful elements operating in the Appalachian economic picture is the large-scale assistance of government agencies in contributing to economic expansion. While recent advances owe much to the mobilization of community resources for economic growth, equally important is the vital assistance provided to the region by state and federal agencies in such fields as transportation, industrial promotion and financing, community and regional planning and education and health. Recent months have witnessed efforts to increase the scale of government intervention to stimulate economic development by means of distressed area legislation.

Toward An Economic Development Program for the Appalachian Region

The wide gap which separates the manpower reserves of the Appalachian Region from available employment opportunities suggests that in future years, as in the past, many of the region's residents will be required to relocate to find jobs. The ebb and flow of manpower from job deficit to job surplus areas has traditionally been a notable and accepted element contributing to the growth of the American economy. Based on experience, the movement of population into and out of various portions of the Appalachian Region can be expected to be closely correlated with local and national economic trends. It is likely that the seriously depressed portions of the region will continue to reduce their chronic job deficit by providing manpower for economically expanding areas within the Appalachians as well as in other parts of the nation.

Implicit in at least some of the past discussions of the Appalachian area is the concept that the region is a relatively static backwater as compared to the nation as a whole. However, the differences between the Appalachians and the nation are tending to diminish. All available indications are that population and economic patterns in the region

have been changing rapidly and the pace appears to have accelerated rather than diminished in the past decade. Most aspects of the economy, much of the transportation network, many of the urban centers and even some of the natural resource patterns are in a state of flux, and this rapid transition shows every sign of continuing.

The serious problems which afflict the Appalachian Region will not be resolved without positive action at all levels of government; the content of government programs and the effectiveness with which they are pursued will be major determinants of whether the people of the Appalachian Region can be made full participants in twentieth century America. We suggest that the following points be taken into consideration in any economic development program for the Appalachian Region.

First: The solution to the massive problems which confront the region must be sought on an interstate and national basis; no state or community can successfully treat its segment of the region as an isolated problem capable of yielding to local initiative. This aspect of the problem is clearly understood in the region, as is shown by even a cursory examination of the testimony presented at the 1959 hearings on Area Redevelopment (distressed area) legislation.[7]

Second: Emphasis should be placed on "portable" investments in human resources through education, welfare and medical programs. This is particularly the case in the rural and mining areas of the Appalachian Region, which are as unlikely in the future as in the past to provide adequate employment for their labor force and hence will continue to be a prime source of manpower for expanding metropolitan areas both within and outside the region.

Third: A major share of attention and development funds should be allocated to the metropolitan areas and larger cities, many of which have demonstrated substantial growth potential in the recent past. The urban areas have many advantages for economic development as compared to the mine and farm areas, including capital, skilled manpower and industrial sites; public services are already available and the new interstate highways will provide most of the region's cities with excellent road linkages. In contrast, in many mining communities and most rural areas enormous investments would be required to provide even the most basic prerequisites for a modern economy.

Fourth: The economic future of the Appalachian Region depends to a great extent on its ability to secure federal aid in large quantities and to make effective use of this assistance. To date, its efforts in this respect have been unimpressive as compared, for example, with the western regions of the nation. Apathy as well as political impotence is responsible: Appalachian communities have passed up tens of millions of dollars in federal urban renewal and public facilities funds.

Fifth: Distressed area legislation, especially of the type proposed in recent years by Senator Paul Douglas, should represent an important step forward in solving the economic problems of the Appalachian Region. It is our belief, however, that this legislation, in the form in which it has been considered by the Congress in

[7] These hearings are invaluable source material for an understanding of the problems, not only of the Appalachian Region but also many of America's other depressed areas. See both Senate and House Banking and Currency Committee hearings on the *Area Redevelopment Act*, 86th Congress, First Session, 1959. Washington, D. C.: United States Government Printing Office.

the past, is not yet a fully satisfactory answer. Some of our disagreement with the distressed area legislation arises from its apparent assumption that federal funds can act as an automatic generator of local industrial jobs, but the most serious deficiency we find is the failure to "count the numbers." An exercise in equating jobs and labor force such as has been attempted in this article appears to indicate that federal loan assistance to local economic development activities can, at best, play only a minor role in narrowing the tremendous gap between labor force and economic opportunities which characterizes the Appalachian Region. In consequence, an effective regional development effort should include provisions for assisting the large-scale voluntary outmigration which is vital to the region's economic future. Programs including welfare services, relocation loans, greatly expanded basic and vocational training assistance and similar "people-oriented" activities in addition to "area-oriented" actions are needed.[8]

[8] For a further treatment of this aspect of the depressed areas problem, see Melvin R. Levin, "What Do We Do With Depressed Areas?" *Iowa Business Digest*, April 1960.

Forestry Practices Under The Agricultural Conservation Program

By LEE M. JAMES* and CON H SCHALLAU**

THE Agricultural Conservation Program (hereinafter referred to as ACP), now administered by the Agricultural Conservation Program Service, was inaugurated under the Soil Conservation and Domestic Allotment Act of 1936. Its history has been marked by numerous organizational and administrative changes and by shifts in program orientation but the basic program, at least since 1944, has held consistently to providing agricultural landowners with financial assistance in carrying out water and soil conservation measures which would not otherwise be undertaken.[1] The practices encouraged are considered to be of benefit to the farmer, but cost-sharing by the federal government is justified on the basis of benefits gained by society.

To fully appraise the forestry achievements of public assistance programs like ACP, one would have to recognize that the objectives are broader than the improvement of forest conditions. However, our concern here is specifically with the relation between ACP and forest conditions and, more particularly, with future timber supply.

Implicit in our discussion of the forestry accomplishments under ACP is the judgment that these forestry practices are needed. The basic case has been set forth in great detail by the United States Forest Service.[2] Under the Forest Service's assumptions about the nation's future population and economy,[3] a great intensification of forestry efforts is needed if the expected level of future timber demand is to be met. The intensification must come soon, largely within the next decade or two, because otherwise it will be too late for the effects to be felt before the year 2000. In sawtimber, the major timber product, the Forest Service's assumptions about medium demand require an increase in growth of 122 percent by the year 2000. Merely to approach this goal will require prodigious efforts to intensify forestry practices.

As the Forest Service interprets the problem, the great need for forest improvement lies with the 4.5 million farmers and other non-industrial private-forest landowners who hold 60 percent of the nation's commercial forest land. Potentially, the forests held by these

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[1] Initially, ACP was intended not merely to encourage water and soil conservation measures, but also to provide funds for encouraging farmers to shift from soil-depleting to soil-conserving crops and to hold soil-depleting crops within assigned acreage allotments. However, in 1944, the latter objective was dropped in favor of the single purpose of promoting conservation. See V. Webster Johnson and Raleigh Barlowe, *Land Problems and Policy* (New York, New York: McGraw Hill Book Company, 1954), p. 95.

[2] United States Forest Service, *Timber Resources For America's Future*, Washington, D. C.: Department of Agriculture, Forest Resource Report No. 14, 1958.

[3] The Forest Service's medium projections of timber needs are based on a number of underlying assumptions including mainly the following: (1) medium projections of population; (2) medium projections of GNP; (3) industrial wood, on the basis of recent trends, will hold its present position in the physical-structure materials mix; and (4) trends in timber products prices will parallel price trends of competitive materials.

mainly small landowners are among the most productive ones[4] although currently they are generally less productive than public or industrial holdings. The Forest Service acknowledges that growth must also be increased on public and industrial forest holdings but (these holdings) "do not have the capacity to sustain future timber demands."[5]

ACP Allocations To Forestry

Data on acreage treated extend back to the beginning of the ACP program in 1936 but cost-sharing data have been isolated for forestry practices only since the initiation of annual summaries of program activities in 1946.[6]

Although annual total ACP payments have fluctuated over the period 1946–58 from a high of $268 million in 1946 to a low of $147 million in 1954, the trend for the full period is almost horizontal (Table I). In contrast, ACP payments for forestry practices have followed a consistently rising curve from $1.0 million in 1946 to $5.9 million in 1958. This is in conformance with a general shift in ACP emphasis toward the more permanent types of conservation practices. As a percentage of the total, payments for forestry have increased from 0.4 to 2.7. The increasing ratio would be even more striking if only "regular" forestry payments were considered and naval stores excluded.[7]

Payments for forestry practices under ACP have been gaining both relatively and absolutely, yet it is noteworthy that the allocation to forestry has remained so small. The allocation in the peak year of 1958 was 2.7 percent of the total and the average for the full 13-year period was 1.0 percent. The question as to what constitutes forestry's proper allocation in the total program is beyond the scope of this article but it is pertinent to note several points which suggest that forestry's share should be larger: (1) The Forest Service analysis, already cited, shows a need for a great intensification of forestry practices, particularly on farm and other nonindustrial private landholdings. A comparable need to step up agricultural

TABLE I—COMPARISON OF ACP PAYMENTS FOR FORESTRY PRACTICES AND TOTAL AGRICULTURAL CONSERVATION PRACTICES: 1946–58

Year	Payments for Forestry[1]	Total ACP Payments	Percentage Forestry of Total Payments
	million dollars	*million dollars*	
1946	1.0	268	0.4
1947	1.3	244	0.5
1948	0.7	124	0.5
1949	1.0	224	0.5
1950	1.4	252	0.6
1951	1.6	246	0.7
1952	1.7	228	0.7
1953	1.5	190	0.8
1954	1.7	147	1.1
1955	2.4	193	1.2
1956	3.7	222	1.7
1957	5.2	216	2.4
1958	5.9	220	2.7
TOTAL	29.2	2,774	1.1

[1] Includes the Naval Stores Conservation Program. Payments for naval stores practices are reported separately from "regular" practices in the annual ACP summaries. Over the 13-year period above, naval stores payments totaled $5.9 million, or 20 percent of all payments for forestry.

[4] *Op. cit.*, p. 107.
[5] *Ibid.*

[6] These annual summaries are the source of all the ACP statistical data used in this article. The title "Agricultural Conservation Program" has been consistent over the full period although subtitles of the annual summaries have changed and the originating agency's name has changed several times. Since 1953 the originating agency has been the Agricultural Conservation Program Service. To avoid constant and unnecessary repetition, the source of ACP statistical data cited in this article will not be referenced to specific annual reports.

[7] Payments for naval stores conservation practices have followed a nearly horizontal trend line except for a jump at the end of the period from $480,000 in 1957 to $552,000 in 1958.

output is not evident.[8] (2) The need to intensify forestry practices in order to affect the timber demands visualized by the Forest Service in the year 2000 is immediate. This is in pronounced contrast to the situation in agriculture where output can be expanded greatly, if necessary, within relatively few years. (3)

TABLE II—ACP PAYMENTS FOR INDIVIDUAL FORESTRY PRACTICES: 1946–58
(*in thousand dollars*)

Year	Tree Planting	Timber Stand Improvement	Other "Regular" Practices	Naval Stores Conservation	All Forestry
1946	$ 257	$ 104	$ 229	$ 470	$ 1,060
1947	299	194	110	695	1,298
1948	261	62	100	246	669
1949	514	89	157	282	1,042
1950	748	130	158	414	1,450
1951	886	123	172	477	1,658
1952	883	111	202	477	1,673
1953	716	162	158	478	1,514
1954	917	330	0	417	1,664
1955	1,271	636	57	416	2,380
1956	2,036	1,135	58	453	3,682
1957	3,049	1,543	78	480	5,150
1958	3,103	2,218	42	552	5,915
TOTAL	14,940	6,837	1,521	5,857	29,155

It is difficult to visualize more physically efficient soil conserving measures than practices designed to improve the quality of presently depleted woodlands or the establishment of forest plantations on depleted or low-grade agricultural soils suitable for forests.[9]

Forestry Practices Recognized by ACP

The 1946–58 record of ACP payments for forestry practices is detailed in Table II. Slightly more than half of all cost-sharing payments for forestry have gone into tree planting. This is the most easily comprehended of the major forestry practices, both by landowners and the local committees responsible for allocating ACP payments. Other forestry practices are not so well understood. It is this fact, perhaps more than any other, which explains the great emphasis placed on tree planting in the total ACP forestry program.

Timber stand improvement has lagged well behind tree planting as an ACP activity although it is gaining in relative position. Under the designation of timber stand improvement are included such practices as pruning, thinning, release of crop trees, removal of undesirable trees or vegetation, and fencing to exclude livestock. At times, other practices have been recognized, a fact which makes the time series of payments for timber stand improvement somewhat ambiguous.

Other "regular" practices include clearing land for planting, forest site preparation, tillage of plantations, maintaining windbreaks, and firebreak construction. Payments for these practices have undergone a decline, from $229,000 in 1946 to $42,000 in 1958. The significance of this decline is uncertain since there has been an increasing tendency to shift minor "regular" practices to the category of timber stand improvement. Currently, other "regular" practices which have not been shifted to timber stand improvement occupy a minor position in the ACP forestry program.

[8] As reflected in crop surpluses, the rate of increase in farm output in recent years has exceeded the rate of increase in demand for farm crops. If the rate of increase in output continues into the future as it has over the past few decades, it will probably keep up with expected increases in crop requirements. For comparisons of 1955 and 1975 per capita consumption of farm crops, see Rex F. Daly, "The Long-Run Demand for Farm Products," *Agricultural Economics Research*, July 1956, Table 4.

[9] The suggestion that forestry practices merit a larger share of total ACP cost-sharing payments is not necessarily related to arbitrary administrative decision. ACP allocations to forestry may also be limited by landowner interest in forestry cost-shares. There is evidence that, within the framework of unit payments offered, some ASC committees are willing to allot more funds to forestry than landowners are willing to request.

A program of payments to gum naval stores operators in the Southeast for approved practices in the tapping of trees has been recognized under ACP. This is a special program, directed by the United States Forest Service rather than the local committees which are responsible for the other phases of ACP. Payments under the Naval Stores Conservation Program have been fairly consistent over the years 1946–58; in total, they have comprised 20 percent of all forestry ACP payments.

Tree Planting Under ACP

Tree planting has been the dominant ACP forestry practice throughout the history of ACP. Over a 23-year period, 1,750,000 acres of acceptable plantings have been achieved (Table III).[10] Sixty-five percent of the planting has taken place in the South, 34 percent in the North, and only one percent in the West. Despite some wide annual fluctuations, the trend of ACP planting is definitely upward—in each major region and the nation as a whole. Planting accelerated at the end of the 23-year period; nearly half of all ACP planting took place in the last five years.

TABLE III—ACREAGE OF ACCEPTABLE ACP TREE PLANTING BY REGION: 1936–58
(thousands of acres)

Year	North	South	West	United States
1936	10	14	*	24
1937	13	11	1	25
1938	19	26	*	45
1939	17	30	*	47
1940	44	65	1	110
1941	29	28	1	58
1942	27	16	1	44
1943	20	12	1	33
1944				
1945	11	3	*	14
1946	19	15	*	34
1947	24	8	*	32
1948	23	26	*	49
1949	28	48	*	76
1950	33	58	*	91
1951	39	45	1	85
1952	34	43	*	77
1953	29	36	*	65
1954	23	68	1	92
1955	29	89	1	119
1956	44	109	2	155
1957	43	172	3	218
1958	44	209	4	257
TOTAL	602	1,131	17	1,750

* less than 500 acres.

ACP planting comprises a substantial part of all tree planting in the United States (Table IV). Even when all plantings prior to the inauguration of ACP are included, ACP represents 18 percent of the total plantings by all classes of ownership. As a proportion of the total, ACP planting has declined since the peak period of 1945–49 but in the most recent period tabulated, 1955–58, ACP accounted for 22 percent of all planting.

The planting achievement under ACP has been considerable, both in relation to all planting by nonindustrial private landowners and planting by all classes of landownership. However, a further perspective is needed in relating the planting achievement to date to the area in need of planting.

Timber Resources for America's Future appraised the magnitude of the overall planting problem at length.[11] At the end of 1952 the Forest Service estimated the area in need of planting (termed "plantable area") to be 52 million acres.

[10] Plantings are reported conservatively as acceptable plantings. Total plantings have been reduced to acceptable plantings on the basis of conversion factors used in the United States Forest Service's *Timber Resources for America's Future* (*op. cit.*, p. 277). In total, 76 percent of past plantings are rated acceptable. Only plantings meeting specified standards of tree survival are termed acceptable. Forest Service data on acceptable acreage are based on average experience with all kinds of forest plantings. There is a presumption that ACP plantings could be expected to have greater success than average plantings since, under ACP, planting stock and site must be approved prior to completion of cost-share agreements.

TABLE IV—COMPARISON OF ACCEPTABLE ACP TREE PLANTING WITH ACCEPTABLE TOTAL PLANTING, BY REGION, TO 1958

	Prior to 1935	1935–1939	1940–1944	1945–1949	1950–1954	1955–1958	All years
North							
ACP planting, thousand acres.		59	120	105	158	160	602
Total planting, thousand acres	889	737	412	292	661	737	3,728
Percentage ACP of total		8	29	36	24	22	16
South							
ACP planting, thousand acres.		81	121	100	250	579	1,131
Total planting, thousand acres	82	446	435	349	1,555	2,316	5,183
Percentage ACP of total		18	28	28	16	25	22
West							
ACP planting, thousand acres.		1	4	*	2	10	17
Total planting, thousand acres	161	80	75	89	273	336	1,014
Percentage ACP of total		1	5	*	1	3	2
UNITED STATES							
ACP planting, thousand acres.		141	245	205	410	749	1,750
Total planting, thousand acres		1,263	922	730	2,489	3,389	9,925
Percentage ACP of total	1,132	11	26	28	16	22	18

* Less than 500 acres.

Regionally, 41 percent of the plantable area is in the North, 42 percent in the South. Eighty-four percent of all plantable area is on private lands.[12]

From 1953 to 1958 the area of acceptable plantings was increased by 4.7 million acres.[13] Thus, by Forest Service standards, plantable area in 1958 totaled about 47 million acres. At the 1958-rate of planting it would take more than 40 years to fully plant the areas termed plantable.

The possible influence of ACP on the nation's tree-planting effort can be brought into sharper focus by comparing ACP planting with planting by nonindustrial private landowners, which is essentially the group eligible for cost-sharing payments (Table V). Virtually 40 percent of all planting by the latter group has been ACP planting. The percentage over the last five years was 42 and in 1958 it was 45.

In physical terms the size of the needed planting job is formidable. At the present rate the job could be virtually completed by the year 2000 but much of it would not be completed in time to contribute to sawtimber supplies until after the turn of the century. Perhaps some of the planting called for is not desirable in economic terms; this is a question which cannot be investigated in this article. However, in terms of the Forest Service analysis, great increases in timber growth must be achieved in relatively few years. To meet the goals established, forest management must be intensified in many directions including an accelerated planting program.

In relation to tree planting programs, some note should be taken of the Soil Bank Conservation Reserve program initiated under the Agricultural Act of

[11] *Op. cit.*, pp. 273–286. Plantable area is defined as nonstocked or poorly stocked forest land or nonforest land on which, judged by 1952 conditions, the establishment of forest tree cover is desirable and practical, and regeneration will not occur naturally within a reasonable time. Plantable area includes virtually all of the nonstocked forest land and a portion of the areas of seedlings and saplings which are more than 10 percent stocked.

[12] *Ibid.*, p. 276.

[13] Data summarized from annual reports of *Forest and Windbarrier Planting* (Washington, D. C.: United States Forest Service).

1956. Under this act, lands are withdrawn from crop production and retired to conservation uses on relatively long-term contracts. Where croplands are converted to tree plantations, contracts provide for reimbursement, in cash or materials, up to 80 percent of the cost of establishing plantations plus annual rentals for the duration of the contract (10 to 15 years when tree cover is established) averaging about $10 per acre. Compared to ACP, this is an expensive program.[14] The programs are not comparable, of course, since the basic purposes are different.

What is of interest here is that with the vastly different financial incentives involved, the rate of planting under the Conservation Reserve is surpassing that under ACP. In the two years, 1957–58, Conservation Reserve tree planting totaled 635,000 acres[15] as compared to 475,000 acres under ACP.

TABLE V—Comparison of Acceptable ACP Tree Planting with All Acceptable Nonindustrial Private Planting, by Region: 1954–58 and All Years

	1954–1958	All years
North		
ACP planting, thousand acres ...	183	602
Nonindustrial private planting, thousand acres	576	1,876
Percentage ACP of nonindustry private	32	32
South		
ACP planting, thousand acres ...	647	1,131
Nonindustrial private planting, thousand acres	1,390	2,593
Percentage ACP of nonindustry private	47	44
West		
ACP planting, thousand acres ...	11	17
Nonindustrial private planting, thousand acres	46	79
Percentage ACP of nonindustry private	24	22
United States		
ACP planting, thousand acres ...	841	1,750
Nonindustrial private planting, thousand acres	2,012	4,539
Percentage ACP of nonindustry private	42	39

Conservation Reserve tree plantings, if continued over a long period of years, could result in substantial additions to the total acreage of forest plantations in the United States. They might, conceivably, have a measurable impact on the forest inventory of the future. However, since these plantings occur on lands not considered as part of the forest resource in *Timber Resources for America's Future*[16] they have little effect on the relationships discussed between ACP planting and area in need of planting.

Timber Stand Improvement Under ACP

ACP payments for timber stand improvement (hereinafter referred to as T. S. I.) have totaled less than half as much as payments for tree planting[17] but the acreage of T. S. I. approaches that of planting: 1,630,000 acres of T. S. I. versus 1,750,000 acres of planting. Since 1955 the annual acreage treated under T. S. I. work has exceeded the acreage planted to trees.

The extent and location of T. S. I. work under ACP is shown in Table VI. Fifty-nine percent of the total work in terms of area has taken place in the South; 38 percent in the North. The long-term trend is definitely upward but the T. S. I. program is better comprehended by separating the post-World-War-II years from the earlier period. In the earlier period, T. S. I. practices were

[14] Cost-share payments for tree planting under ACP have averaged about $11 per acre which is barely more than the rental cost for one year under the Conservation Reserve program.

[15] United States Department of Agriculture, *Conservation Reserve Program of the Soil Bank, Statistical Summary* (Washington, D. C.: Commodity Stabilization Service and Agricultural Conservation Program Service), 1957 and 1958.

[16] *Op. cit.*, p. 273.

[17] Over the period 1946–58, payments for timber stand improvement totaled $6,837,000 as compared to $14,940,000 for tree planting.

concentrated in the North; in the postwar period, they have been concentrated in the South and the acreage treated has expanded rapidly. Fifty-nine percent of all T. S. I. practices in terms of area took place in the last five years of the 22-year period under review and more than three-fourths of this recent work was located in the South.

TABLE VI—TIMBER STAND IMPROVEMENT UNDER ACP, BY REGION: 1937–58
(thousands of acres)

Year	North	South	West	United States
1937	44	2	0	46
1938	45	3	0	48
1939	47	3	0	50
1940	96	9	*	105
1941	61	5	*	66
1942	64	4	1	69
1943	33	2	0	35
1944	0	0	0	0
1945	0	*	0	*
1946	0	35	*	35
1947	10	52	*	62
1948	3	18	*	21
1949	5	19	1	25
1950	6	23	1	30
1951	8	13	*	21
1952	6	15	*	21
1953	9	20	1	30
1954	15	59	2	76
1955	28	102	3	133
1956	41	161	5	207
1957	46	173	9	228
1958	60	250	12	322
TOTAL	627	968	35	1,630

* Less than 500 acres.

The T. S. I. accomplishment under ACP is undoubtedly large in relation to the total T. S. I. effort on nonindustrial private forest land. The Forest Service[18] estimated that 2 percent of the nonindustrial forest landowners undertook some T. S. I. work during the period 1947–53. Since many of the properties involved were not entirely involved, it is a safe guess to presume that substantially less than 2 percent of the forest land in this class of ownership was treated. During the same period of time, 1947–53, T. S. I. work under ACP was carried out on some 210,000 acres of forest land. The acreage treated under ACP represented 0.7 percent of the 296,000,000 acres of commercial forest land in nonindustrial private ownership. Thus, it appears that a large portion, perhaps more than half, of all T. S. I. work on nonindustrial private lands was performed under ACP.

The ACP achievement is less impressive, although not negligible, when measured against T. S. I. work on public and forest industrial lands. The Forest Service reports that in 1958 T. S. I. activities were carried out on 1,224,000 acres of national forest lands.[19] To approximate the area of T. S. I. work on other public and forest industrial lands in the same year requires some degree of conjecture, but a reasonable estimate would be about 1,000,000.[20] Thus, in total, it might be presumed that T. S. I. work was performed on a commercial forest area in 1958 ranging in estimate from 2.5 million to 3.0 million acres. ACP would account for 13 percent of the lower estimate, 11 percent of the higher.

In relating the extent of T. S. I. work under ACP to the total job that needs to be done, it becomes quickly apparent

[18] *Op. cit.*, p. 312.

[19] United States Forest Service, *Report of the Chief of the Forest Service, 1958* (Washington, D. C.: Department of Agriculture, 1959).

[20] The total acreage of commercial forest in these categories of ownership amounts to 107,000,000 acres as compared with 85,000,000 acres on national forests. Productivity ratings of recent cuttings on national forests are slightly higher than on other public and forest industrial lands (*Timber Resources For America's Future, op. cit.*, p. 303). Insofar as the ratings may be considered an indication of management effort and, indirectly, of T. S. I. practices, the efforts on other public and forest industrial lands should approach those on the national forests.

that the achievement to date is of modest proportions. It is safe to assume that under the long-range goals established by the Forest Service, T. S. I. practices will be required on a large part of the 296,000,000 acres of commercial forest in nonindustrial private ownership. The rate of progress under ACP—1.6 million acres in 22 years—taken in conjunction with a similar rate undertaken independent of ACP appears quite inadequate.

The degree of inadequacy in the ACP achievement is more clearly established by comparing the current rate of achievement with that of the national forests. *Timber Resources For America's Future* makes it clear that the need for T. S. I. work on the national forests is not as great generally as on non-industrial private forest lands.[21] Nevertheless, to meet its long-term objectives, the Forest Service is currently conducting T. S. I. practices on 1.4 percent of its commercial forest land annually. In contrast, T. S. I. work under ACP is currently extended to only 0.1 percent of the commercial forest land in nonindustrial private ownership. If the rate of progress on the national forests can be viewed as the rate needed to achieve long-range goals, then it is clear that the rate of progress on nonindustrial private forest lands is far below the rate needed.

Summary

Forestry accomplishments under the ACP program are reviewed in this article in terms of cost-sharing payments, acreages affected, and the magnitude of the job that needs to be done in order to meet the long-range timber growth goals established by the Forest Service's recent analysis of the forest situation in the United States.

Cost-sharing payments for forestry practices under ACP increased from $1.0 million in 1946 to $5.9 million in 1958 but the current allocation to forestry is less than 3 percent of total ACP payments. A number of considerations suggest that the percentage allocation to forestry should be larger.

The most important ACP forestry practices, judged both by costs and effects on the national timber situation, are tree planting and timber stand improvement.

Over a 23-year period, 1,750,000 acres of acceptable ACP plantings have been achieved. This is an impressive record, representing 18 percent of all acceptable tree plantings in the United States. However, in view of the planting goal established by the Forest Service, considerable room for expanded tree plantings exists. At the 1958 rate of planting by all classes of owners and under all programs, it will take more than 40 years to meet the planting goal.

Timber stand improvement (T. S. I.) practices under ACP have been applied to 1,630,000 acres. The accomplishment is large in relation to the total T. S. I. effort on non-industrial private forest land, but it is less impressive when measured against T. S. I. work on all forest lands. In 1958, ACP accounted for an estimated 11 to 13 percent of total T. S. I. work in the nation. In terms of the Forest Service's analysis of the job required, T. S. I. efforts need to be greatly intensified. One measure of the acceleration needed is provided by T. S. I. work on the national forests: here the portion of the total acreage treated annually is at least 14 times greater than the corresponding percentage for nonindustrial private forest lands.

[21] *Op. cit.* Data on growing stock, degree of stocking, quality of timber, cutting practices, etc., show the need for improvement is greater on non-industrial private lands than on public or forest industrial lands.

A Method for Measuring the Value of Imports into an Urban Community

By HOMER HOYT*

AN EXTENSIVE LITERATURE in the form of articles, monographs and books has been written on the economic base, in which the chief objective has been to determine the number of workers engaged in basic employment, i.e., producing goods or services for export as compared with the number in non-basic employment—or production for local consumption.[1] It is a formidable task to allocate exactly what proportion of the goods manufactured in a city is shipped to outside markets, when the product is one consumed both locally and nationally. A most meticulous study to determine as accurately as possible how many workers were engaged in export activities in Madison, Wisconsin was made in 1952.[2] In other studies made in the United States the authors have been content with approximations based on the assumption that the workers in excess of the number employed on the average by the same population were basic workers.[3]

The measurement of the dollar value of imports and exports of a small town in the United States (Oskaloosa, Iowa) was first developed by the staff members of *Fortune* magazine in 1938.[4] In 1948, in my survey of Brockton, Massachusetts, I estimated the income and expenditures of families in the Brockton, Massachusetts area, showing both employment and payrolls in basic and non-basic employment as of that year.[5] These were isolated examples, however, and no method was devised which could be quickly and easily applied to a large number of urban regions.

Most of the approaches to the economic base hitherto made have thus been from the export side of the balance sheet and these studies have attempted to show how many workers were engaged in producing goods or services which were for the benefit of persons living outside the given urban community, compared with the number of workers engaged in producing for local consumption. In the long run, however, the value of exports is equal to the value of imports or vice versa. The value of the food and manufactured products delivered to a city represents the amount that must be paid for by exports in one form or another. So it occurred to me that it would be easier, in the case of many urban communities, to measure the wholesale value of goods

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[1] Homer Hoyt, "The Utility of the Economic Base in Forecasting Urban Population," *Land Economics*, February 1961; Richard B. Andrews, "Mechanics of the Economic Base: Historical Development of the Base Concept," *Land Economics*, May 1953, pp. 161–167; see this and other articles reprinted in, Ralph W. Pfouts, *The Techniques of Economic Analysis* (West Trenton, New Jersey: Chandler-Davis Publishing Company, 1960).

[2] John W. Alexander, *An Economic Base Study of Madison, Wisconsin* (Madison, Wisconsin: University of Wisconsin Commerce Papers, Volume I, Number 4, June 1953).

[3] Homer Hoyt, *The Economic Status of the New York Metropolitan Region in 1944* (New York, New York: Regional Plan Association of New York, 1944), p. 6; Ezra Solomon and Zarka Bilbija, *Metropolitan Chicago*, (Glencoe, Illinois: Free Press, 1959) pp. 63, 64.

[4] "Oskaloosa Versus the United States," *Fortune*, 1938, cited by Richard B. Andrews in, Pfouts, op. cit., p. 11.

[5] Homer Hoyt Associates, *A Report on the Economic Base of the Brockton, Massachusetts Area, 1949.*

shipped from outside the urban region to its borders than to calculate the exact value of the products of all industries and services that are exported. The task of evaluating imports is simplified by the United States Census of Retail Business, which is normally taken every four years (the last census being for 1958), which shows the retail sales in every city, county and metropolitan area in the United States by type of store. These data of course show the volume of *retail* sales, not *wholesale*. Retail sales include the markup covering wages of clerks and store managers, local real estate taxes, interest and depreciation on store buildings or rents, local delivery charges, sales taxes and profits of the store owners. However, by deducting from the retail prices the normal markup in each type of merchandise, an estimate can be made of the wholesale cost of every kind of goods.

In order to secure an estimate of the value of goods imported which are consumed by the residents of the urban region, two further calculations must be made. First, the department and apparel stores in some large metropolitan centers sell to customers living beyond the borders of the metropolitan area, and deductions from total retail sales must be made to allow for these purchases. The amount sold outside the metropolitan area can be estimated by calculating the normal expenditures of families in the urban region in each type of store for 1958, or the year of the last retail census, which is usually approximately the same percentage of their income as families spend in the state as a whole. If the retail sales reported in the Census are higher than the estimated purchases of the residents, the figure for estimated purchases is used. In the case of food stores, gasoline service stations, drug stores, variety stores, hardware stores and many specialty stores, the retail sales usually represent only the purchases of local residents.

The second deduction that must be made from total retail sales is of course the value of all merchandise produced and consumed locally. This would be a more difficult operation for a metropolitan area like New York, with its numerous industries such as apparel production for local consumption, than for a single industry city such as Detroit. However, even in the case of New York, it would be estimated that most of the food, automobiles, gasoline, furniture and many other items would be produced outside of the metropolitan area. The larger the area included in the region, the more self-sufficing it would be; and the less the value of the imports.

In addition to food, hard goods, and other merchandise, the chief other import item would be federal income taxes, or that portion of federal income taxes paid for non-local services such as national defense, and activities of the federal Government apart from local postal services.

There are various other items going to the import side of the ledger, such as foreign travel and travel outside the city, expenditures for college students in other cities, and interest and profits on local businesses owned by non-residents, which are difficult to estimate in detail. However, they represent only a minor part of the total imports and hence an error in calculating their amounts would not seriously affect the total result.

A check on the accuracy of the value of the imports of an urban region can be made by estimating the value of the exports comprising the wages of the workers in export industries, the profits and

interest paid to residents on investments outside the city, tourist expenditures, etc. The total value of imports should be equal to the total value of exports but an exact bookkeeping balance cannot be expected because none of the items on either the export or import side can be measured with exactitude.

The method proposed here is not a forecasting tool. Its utility consists in demonstrating the absolute necessity of having export activities to pay for imports for no amount of legerdemain can conceal the fact that what is shipped in from outside the urban region and sold over the retail counters must be paid for by exports. This method can also be used to establish the ratio between basic and non-basic production. In order to show concrete examples of how this method can be used, I have applied it to two metropolitan areas—Detroit and Washington, D. C.

Application of Method to Washington, D. C. Metropolitan Area, 1958

In the Washington, D. C. metropolitan area the amount of manufacturing is insignificant so that not only must all food but almost all manufactured articles be imported from outside the area. Consequently, the residents of Washington must produce a surplus sufficient to pay for what they import. The chief basic activity is employment in the federal government. Most federal employees, except those in local postal service, are producing a national service for which they are paid from federal taxes, derived mostly from outside the Washington, D. C. metropolitan area. I estimate that the income of the Standard Metropolitan Area in 1958 (which year is used because of the availability of the United States Census of Retail Trade for that year) is $4,311,000,000, derived as follows:

	Number of Households	*Average Income*	*Total Income (Thousands)*
Washington, D. C.	250,000	$7,000	$1,750,000
Montgomery County, Md.	92,000	9,000	828,000
Prince Georges County, Md.	93,000	7,000	651,000
Fairfax County, Va.	61,000	7,000	427,000
Arlington County, Va.	57,000	8,000	456,000
Alexandria, Va.	25,000	7,000	175,000
Falls Church, Va.	3,000	8,000	24,000
TOTAL	581,000	$7,420	$4,311,000

Payrolls for the Washington metropolitan area for 1958 were estimated at $3,312,543,500.[6] In 1958 retail sales in the Washington metropolitan area, including the above jurisdictions, were $2.5 billion. However, these retail sales in the Washington area represented more than the purchases of the residents of the area, as shown by the fact that general merchandise sales, apparel sales, sales of eating and drinking places, drug stores and liquor stores were far above the national average percentages. When adjustments are made, I estimate that purchases of the Washington area residents in retail stores were $2,300,000,000, or 53.4 percent of area income, compared with a national average of 50 percent of national income spent in retail stores in 1958.

These retail store purchases covered the wages of store clerks, store managers, deliverymen, warehousemen, rents of the stores which paid real estate taxes and sales taxes supporting local government, interest and depreciation on investment in store buildings, all of which was spent locally. Also these sales covered the profits to the store owners. I estimate, on the basis of normal retail markups, that the cost of the food, clothing, automobiles, furniture and other articles delivered to the Washington area in 1958 was 65 percent of the retail purchases, or $1,500,-

[6] *The Evening Star*, Washington, D. C., January 5, 1960.

000,000, as the following tabulation shows:

	Retail Purchases	*Percent Retail Price*	*Wholesale: Total Cost*
General Merchandise	$ 259,000,000	60	$ 155,000,000
Food	598,408,000	72	432,000,000
Automotive Group	381,564,000	75	286,000,000
Gas Service Stations	159,015,000	75	119,000,000
Apparel	151,000,000	60	91,000,000
Lumber, Building Mtls.	96,608,000	70	68,000,000
Furniture	133,827,000	55	74,000,000
Eating, Drinking Places	178,000,000	40	71,000,000
Drug Stores	79,000,000	60	47,000,000
Other Retail Stores	216,000,000	60	128,000,000
Non-store Retailers	47,698,000	60	29,000,000
TOTAL	$2,300,120,000	65	$1,500,000,000

Washington residents would be required to perform basic services to cover the cost of these imported goods. The foregoing averages of the percentage or retail price represented by cost of local distribution have been based on Barger's estimate that all distribution costs averaged 37.4 percent of retail value in 1948; that department store retail margins were 35.6 percent of retail prices and chain grocery store margins were 17.5 percent of retail prices; and that chain furniture store margins were 44 percent of retail price in 1947.[7]

In the first quarter of 1960 the Controllers Congress of the National Retailers Merchants Association reported that the cumulative markup of department stores was 34 percent of sales, of which payrolls represented 20.1 percent of sales.[8] The cost of goods sold by department stores was 63.7 percent of retail sales price. Of the total margin of 36.3 percent, 18 percent went for payrolls, 3 percent for real estate taxes, 2.7 percent for advertising, and 10.2 percent for other expenses, according to a Harvard University study in 1958. I have made some allowances for food processing, profits to the stores, local freight charges and sales taxes. These percentages I have used are not the exact retail margins. To obtain extreme accuracy it would be necessary to secure the retail markup of every store in the Washington, D. C. metropolitan area, but I believe that the overall results are substantially correct.

In 1958, 15.3 percent of the national income was spent for housing and home maintenance; 11.9 percent was paid in federal income taxes; 2.5 percent was for transportation and 6.5 percent was saved. Applying these ratios to Washington area income, as the following tabulation shows, we find an estimated $659,500,000 was spent for housing, $108,000,000 for transportation and $451,000,000 for medical, dental services, domestic service, for services of laundries, cleaners and for entertainment and recreation. Practically all of these outlays were spent locally:

		Percent
Income	$4,311,000,000	100.0
Retail Expenditures	2,300,000,000	53.4
Housing, Home Maintenance	659,500,000	15.3
Federal Income Taxes	513,000,000	11.9
Transportation	107,800,000	2.5
Savings	280,200,000	6.5
Medical, Dental, other professional services, Entertainment, Travel	450,500,000	10.4
TOTAL	$4,311,000,000	100.0

In the case of the federal income tax levies of $513,000,000, while much more than that went to paying federal government employees in Washington, most of the federal employment was for national and not local services. Deducting from the income taxes of $513,000,000 paid by the residents, an estimated $180,000,000 paid to 12,000 federal employees in the

[7] Harold Barger, *Distribution's Place in the American Economy* (Princeton, New Jersey: Princeton University Press, 1955).

[8] *Women's Wear Daily*, July 28, 1960, p. 1.

post office and to 18,000 other federal employees who would represent the area's share of national services, there would remain $333,000,000 as the contribution of the area residents to national services, which is in the nature of an import. The total money required to pay for the Washington area imports may thus be estimated as follows:

Wholesale cost of imported merchandise	$1,500,000,000
Federal income taxes, not spent for local services	333,000,000
Other services rendered by non-residents, travel outside area, profits and interest to non-residents, etc.	167,000,000
TOTAL	$2,000,000,000

Thus, the Washington, D. C. area was required to pay $2 billion in 1958 for goods and services furnished by persons outside the area and its basic activities would have to yield $2 billion to pay for these imports.

The dollar volume of non-basic activities can be ascertained by deducting from the total income of $4,311,000,000 the $2,000,000,000 in imports, or the same in exports. The non-basic activities account for a volume of $2,311,000,000. The ratio between basic and non-basic activities is thus 1 to 1.15. Basic activities would thus account for 46 percent of total activity in the Washington area. This calculation on the basis of dollar imports or exports can be checked with estimates of basic and non-basic employment.

In the Washington, D. C. metropolitan area in November 1958 there were 228,100 federal employees, of which 198,000 were performing non-local services; there were 59,000 in military personnel, 7,400 employees in interstate railroads and 9,100 employees in hotels and lodgings, which may be considered chiefly basic—or a total of 273,000 basic workers. In addition there are employees in news agencies; the Central Intelligence Agency; labor union headquarters; lobbyists centered at Washington; national research organizations; and non-local manufacturing—which have been estimated at 27,000. While extensive research would be required to arrive at meticulously exact figures, I would estimate that 300,000 persons, or 44 percent of the total of 678,600 employed in the Washington, D. C. metropolitan area in November 1958 were engaged in basic activities.

The payroll of the federal government in Washington, D. C. in 1958, most of which was basic activity, was $1,417,912,000. In addition there was a payroll of $250,000,000 for military personnel, $50,000,000 for the Central Intelligence Agency, and an estimated $300,000,000 for non-government basic activities. Thus, the pay of the basic workers alone would account for $2,000,000,000, or the amount necessary to pay for the imports of the Washington, D. C. area.

Application of Method to Detroit, Michigan

As another illustration of the application of the method of estimating the dollar amount of imports, or the amount required to pay for the exports of a metropolitan region, we take the Detroit Standard Metropolitan Area, consisting of Macomb, Oakland and Wayne Counties, Michigan. The population of this metropolitan area in April 1960 was 3,761,000. The population in the year 1958, which is the year used to compute the dollar volume of imports, is estimated at 3,600,000. The total personal income of families in the Detroit Standard Metropolitan Area for 1958 is estimated at $7,850,000,000.

The total retail sales of all the stores in the Detroit Standard Metropolitan area were $4,448,170,000 in 1958. These sales represented chiefly the purchases of the residents of the Detroit Standard

Metropolitan Area as shown by the fact that for most stores the sales were approximately the same percentage of the area income as the national and state averages. However, in the case of the general merchandise sales, Detroit department stores such as the J. L. Hudson Company and Montgomery Ward draw customers from outside the metropolitan area and these sales in the Detroit area amounted to 7 percent of the area income, compared with 6 percent for the national general merchandise store sales as percentage of national income in 1958. Accordingly, I have reduced general merchandise purchases from the sales figures of $578,422,000 in 1958 to $471,000,000, which is 6 percent of area income. The sales of other stores were taken as representing area purchases, since minor differences may be due to differences in local tastes. The total retail expenditures of Detroit families in 1958 were $4,340,750,000 or 55.3 percent of their income.

What proportion of these retail expenditures of Detroit area families represented the cost of food, clothing, building materials, furniture, gasoline, etc. imported into the area?

As already noted in the case of the Washington, D. C. metropolitan area, the receipts from retail sales cover the wages of clerks, store officials, deliverymen and warehousemen, the rent of the store, which pays real estate taxes, interest and depreciation on the building, sales taxes, advertising in local newspapers, all of which is spent locally. These receipts also include the profits of the store operators and, if owned locally, these sums are also spent in the community. I have estimated that 40 percent of the retail sales receipts of most retail outlets, except automotive sales rooms, represent the amounts paid to local workers, or property owners, or to local governments. In Detroit, where automobiles are manufactured, not only the commissions and profits of the dealer but the wages of workers in automobile and automotive accessory plants, the interest on the plant investment, the real estate taxes on the plants and part of the profits of the automobile companies are spent locally. Only the cost of the iron ore, glass, rubber, aluminum, fabrics and other raw materials, and the dividends on stocks owned outside Detroit, would require exports of dollars. I estimate that these items would not amount to more than 20 percent of the total retail price.

While food store margins of profit are estimated at 18 percent of retail price, I have used 28 percent of retail price to allow for local bakeries, ice cream plants and other food processing industries. As the following table shows, I estimate that 55.8 percent of the total retail purchases of the residents of the Detroit area in 1958 would pay for the cost of all the products imported into the area, which would amount to $2,420,000,000.

TABLE I—ESTIMATED DOLLAR VALUE OF IMPORTS OF RETAIL MERCHANDISE INTO DETROIT METROPOLITAN AREA: 1958

	Retail Purchases	*Percent Paid for Imports*	*Value of Imports*
Gen'l Merchandise Group	$ 471,000,000	60	$ 283,000,000
Apparel Stores	276,054,000	60	166,000,000
Furniture and Household Appliance Stores	228,866,000	55	126,000,000
Food Stores	1,139,931,000	72	821,000,000
Eating and Drinking Places	348,910,000	40	140,000,000
Drug Stores	192,716,000	60	116,000,000
Automotive Dealers	785,017,000	20	158,000,000
Gasoline Service Stations	322,284,000	75	242,000,000
Lumber and Bldg. Materials	222,203,000	70	156,000,000
Other Retail Stores	256,323,000	60	154,000,000
Non-store retailers	97,444,000	60	58,000,000
TOTAL	$4,340,748,000	55.8	$2,420,000,000

Retail purchases account for all goods imported into the Detroit area which require dollar payments to persons living outside the area. What other services are of an import nature?

In 1958, the personal income of families in the United States was disposed of as follows:[9]

	Billions of Dollars	*Percent*
Total personal income	$359.0	100.0
Personal income tax and non-tax payments	42.6	11.9
Retail Purchases	179.5	50.0
Housing and Household operation	54.9	15.3
Transportation	9.1	2.5
All other services	49.4	13.8
Savings	23.5	6.5

In Detroit retail purchases for 1958 are estimated at 52.9 percent of income, or slightly higher than the 50 percent average for the United States.

In the absence of a definitive study of the expenditures of all Detroit families, their expenditures by main division can be estimated as follows:

EXPENDITURES OF FAMILIES IN DETROIT STANDARD METROPOLITAN AREA: 1958

		Percent of Income
Total Income before Federal Income Taxes	$7,850,000,000	100.0
Retail Purchases	4,340,750,000	55.3
Rents or Home Payments, and Household Maintenance	1,201,050,000	15.3
Transportation	196,250,000	2.5
Savings	510,250,000	6.5
Federal Income Tax and Social Security Deductions	934,150,000	11.9
Balance: medical and dental services, beauty, barber shops, cleaners, recreation and amusement	667,550,000	8.5
TOTAL	$7,850,000,000	100.0

Of these total expenditures, housing and household maintenance, savings, payments to doctors, dentists, lawyers, beauty and barber shops, laundries, cleaners, and expenses of recreation and amusement, would be spent chiefly locally.

The main item requiring export of dollars in addition to retail purchases would be federal income taxes of $934,150,000. Of this total the amount going to federal employees engaged in the postal service and other strictly local activities is estimated at $230,000,000. The balance of approximately $704,000,000 would be in the nature of imports, or services rendered by the governmental agencies outside of the Detroit area which would have to be paid for by exports.

The total dollar amount required to pay for imports into the Detroit area in 1958 can be summarized as follows:

Imports of retail merchandise	$2,420,000,000
Federal income taxes	704,000,000
All other: travel outside Detroit, interest and dividends on investments owned by non-residents, etc. (estimated)	250,000,000
TOTAL	$3,374,000,000

Thus, to pay for its imports, Detroit would have to export an estimated total value of goods in the form of automobiles or other manufactured articles—or to perform services for persons living outside the area—amounting to $3,436,000,000.

Payments to basic workers and interest and profits to basic industries would thus amount to $3,374,000,000 in 1958 and the balance of the personal income of the Detroit area, amounting to $4,476,000,000, would constitute payments to non-basic workers and interest and dividends on investments in non-basic industries. The ratio of basic to non-basic activities in dollars would thus be 1 to 1.33, and basic activities would constitute 43 percent of the total in the Detroit area in 1958.

[9] United States Department of Commerce, *Business Statistics, 1959* (Washington, D. C.: Government Printing Office, 1959) pp. 4, 48.

Of course these figures are subject to refinement. The total amount of every type of manufactured goods consumed locally could be minutely computed; the dollar amount of dividends or interest going to non-resident investors might be ascertained; the exact markup and costs of every type of retail store might be discovered; and further studies along the lines suggested would develop more exact computations.

The Detroit Plan Commission estimated that the ratio between basic and non-basic employment in Detroit was 1 to 1.1 in 1940. An exact correspondence between the two methods cannot be expected because of the difference in time and because the ratio of dollars paid in basic employment to dollars paid in non-basic employment is different from the ratio between the numbers in basic and non-basic employment.

New York and Chicago

As metropolitan areas become more diversified, producing more and more for their own requirements, the proportion of basic workers to the total may be expected to decline. In my survey of the New York Region in 1944, I found that basic employment of 1,500,000 was only 31.6 percent of total employment.[10] In a study of metropolitan Chicago the authors estimated that 30 percent of the wage earners of the Chicago region depended on export markets in 1956 and, after adjustments, that 20 percent of all the employment in the area was export based.[11]

A Diversified Hypothetical City

As an illustrative case, showing how proportion of basic employment would shrink in a region with a diversified base, suppose that the urban region in question has factories which produce its own apparel, general merchandise items, furniture, etc., and has plants for assembling automobiles. It is required to import chiefly food and raw materials but the food is largely processed in its own plants.

This hypothetical region has a population of 1,000,000 and a personal family income of $2 billion. Its normal expenditure pattern is as follows:

Total income	$2,000,000,000
Retail purchases	1,000,000,000
Federal income taxes	240,000,000
Housing and home maintenance	300,000,000
Savings	100,000,000
All other expenditures	360,000,000

The chief requirement of this city for imports is only the amount sufficient to pay for raw food products, wool, silk, semi-fabricated materials. If it is a large financial center, profits on its industries may flow entirely into local banks and into hands of local investors who spend the money in the area. The amount needed to pay for imports in this hypothetical city may be illustrated as follows:

Retail Purchases		*Percent Imports*	*Total Imports*
General Merchandise	$ 120,000,000	20	$ 24,000,000
Apparel Stores	80,000,000	20	16,000,000
Furniture, T V, Radio	60,000,000	20	12,000,000
Food Stores	280,000,000	50	140,000,000
Automotive Dealers	180,000,000	50	90,000,000
Eating and Drinking Places	80,000,000	40	32,000,000
Drug Stores	50,000,000	40	20,000,000
Gasoline Serv. Stations	60,000,000	50	30,000,000
Lumber & Bldg. Materials	40,000,000	50	20,000,000
Other retail stores	50,000,000	40	20,000,000
TOTAL	$1,000,000,000	40.4	$404,000,000

Instead of paying 60 to 65 percent of its expenditures out for imports, this hypothetical urban region would pay only 40

[10] Homer Hoyt, *Economic Status of the New York Metropolitan Region in 1944, op. cit.*, p. 6.

[11] Solomon and Bilbija, *Metropolitan Chicago, op. cit.*, pp. 68, 69, 71.

percent, or $404,000,000. The chief other requirement to pay for services would be that of federal income taxes of $24,000,000, of which an estimated $1,500,000 would be for local federal employees.

The total requirements to pay for imports would be as follows:

Imports of merchandise	$404,000,000
Federal income taxes	22,500,000
Other payments to non-residents	60,000,000
TOTAL	$486,500,000

Total dollar volume required to pay for imports in the hypothetical self-sufficing city would thus be $486,500,000, or 24.3 percent of total area income of $2,000,000,000. The income of non-basic activities would thus be $1,513,500,000. The ratio of basic to non-basic activities would be 1 to 3.26. This hypothetical example shows how the proportion of basic to non-basic activities is much lower in diversified regions like New York or Chicago than in one-industry regions such as Washington or Detroit.

Basic Employment in Retail Trade in Large Metropolitan Areas

Urban regions with diversified manufacturing which supply a higher percentage of the fabricated articles consumed locally thus will need a lower proportion of basic workers to non-basic workers than single industry cities because their imports are less. Also, in a very large metropolitan area more of the workers in retail trades will be classified as basic than in smaller cities and hence it will require fewer basic workers in manufacturing and other lines to pay for its imports than will the smaller urban communities.

A metropolitan (regional) area has department stores large enough to supply every variety of merchandise in all price ranges and a sufficient number of clothing and shoe stores to meet all the shoppers' needs. Likewise it has a complete selection in furniture, household appliances, etc. Consequently, residents of the larger metropolitan area usually make all of their retail purchases in the stores of that area. Consequently, they pay the wages of clerks, deliverymen, managers, rents, real estate taxes and insurance in the normal retail markup. Only the wholesale cost of the merchandise, or approximately 60 percent of the retail price, constitutes the imports, as in the case of Washington, D. C.

On the other hand, where the size of a city is too small to support a department store with a full range of merchandise, the residents of the small city will travel to a larger city to make all or part of their purchases. When residents of the smaller city patronize retail stores out of their town, 100 percent of their purchases represent imports for they pay not only for the wholesale cost of the goods but also for salaries of clerks, rents, etc. in the larger city. The difference in the basic employment, or the amount of money necessary to pay for imports, between a large city with stores large enough to offer a complete variety of merchandise and a small city, may be illustrated as follows.

City A, with a population of 700,000 or 200,000 households, having aggregate personal income of $1,000,000,000, has retail sales in its stores of $800,000,000, of which $600,000,000 represents the retail purchases of its residents; and $200,000,000 is the volume of trade attracted from outside of the metropolitan area by reason of the larger size and greater number of its retail stores compared with the surrounding small towns. The residents of City A would be required to provide out-of-town payments for only the cost of goods purchased at wholesale for the consumption of its own residents, or 60

percent of $600,000,000 which would be $360,000,000, the balance of the retail price going to its own residents for wages of clerks, rents, profits, etc. Purchases of non-residents would pay the wholesale cost of the goods purchased by non-residents, or $120,000,000, as well as providing a surplus of $80,000,000 to cover wages of clerks, rents, profits, etc., for the goods they bought.

Thus $360,000,000, or 36 percent of the total income of $1,000,000,000, would be the total value of goods or services that would have to be exported to pay for the imports of merchandise.

In *City B* the 70,000 persons or 20,000 households have aggregate personal income of $100,000,000, but the city is not large enough to warrant department stores and other stores with a full range of merchandise. Instead of the retail purchases of $60,000,000 by the residents being made entirely in local stores, only $40,000,000 is made in these stores and $20,000,000 goes outside the area of City B. Consequently, of the $40,000,000 worth of retail merchandise bought by the residents in their home city, only 60 percent or $24,000,000 goes for imports or to pay for the cost of the goods delivered to their city, the balance going to payrolls of clerks, rents and profits that is spent locally. On the other hand, all of the $20,000,000 spent in other metropolitan areas, including payrolls of the clerks, rents, etc. of the stores of the other city, is an import, because no part of the $20,000,000 is spent locally. Consequently, City B must produce exports to pay for $24,000,000 bought at home and the entire $20,000,000 bought elsewhere, or a total of $44,000,000. Thus the smaller City B would have to produce exports equal to 44 percent of the income of its residents to pay for merchandise imports, while the larger metropolitan City A would have to produce exports of only 36 percent. John Alexander found that the basic employment in Oshkosh, Wisconsin, with its smaller stores, was 63.1 percent of total employment, while in Madison, with its large department stores and a great variety of other stores, it was 54.2 percent.[12]

This may be further illustrated by cities in the trade area of Tampa, Florida. Tampa, in Hillsborough County, Florida, has large department, apparel and other stores, and is the chief retail trading center for 15 other counties, north, south and east of Tampa. In 1958 Hillsborough residents had aggregate personal income of $645,747,000 and its retail sales were $444,134,000. It is estimated that if its residents spent the same percentage of their income in the retail stores as the United States average, they would have spent $362,974,000 in these stores. The difference between the sales and the purchases of residents was $81,160,000, which is the estimated purchases of non-residents. Hillsborough County residents then had to pay for retail goods consumed—$362,974,000, of which 60 percent or $218,000,000 represented the amount to be paid for imports and $145,000,000 represented payment to local clerks, deliverymen, managers, rent, real estate taxes and profits. The non-residents paid not only the wholesale cost of $81,160,000 worth of goods sold to them but also the wages of local clerks and the other items in the retail markup. Thus Hillsborough County would have to have basic employment sufficient to pay $218,000,000 for the wholesale cost of goods

[12] John W. Alexander, reprinted from *Economic Geography*, July 1954, pp. 246–261. See also, Harold M. Mayer and Clyde F. Kohn, Readings *in Urban Geography* (Chicago, Illinois: University of Chicago Press, 1959), p. 91.

in addition to payment for federal government and other services.

On the other hand, the retail stores of the other 15 counties in the trade area, whose residents had aggregate income of $731,610,000 in 1958, had aggregate sales of only $351,465,000, while the estimated purchases of the residents were $411,165,000, or $59,700,000 more.

Table II shows the dollar value of imports required for each of the fifteen counties in the Tampa trade area to pay for imports.

The following tabulation of population of counties and percent basic employment required to pay for imports of merchandise in Hillsborough County trade area shows there was generally a higher proportion of basic employment requirements in counties with the smallest population; but this would be due to the lack of large retail stores in these counties or the propensity of the residents to shop outside of the county, rather than to population size itself:

County	*Population 1960*	*Percent Basic*
Hillsborough	391,965	33.80
Polk	192,777	38.80
Sarasota	75,253	36.43
Manatee	68,464	34.03
Pasco	36,522	34.65
Highlands	21,131	37.72
Hardee	13,048	34.12
Sumter	11,810	36.15
De Soto	11,491	36.42
Hernando	11,128	37.09
Levy	10,286	47.45
Citrus	9,098	35.36
Hendry	8,049	40.83
Dixie	4,454	33.90
Glades	2,940	46.67
Gilchrist	2,874	47.45

The foregoing calculations do not show the number of basic workers employed in any county, but the dollar volume in the form of wages, rents, interest and profits necessary to pay for the imports.

TABLE II—Personal Income, Retail Sales, Basic Employment of Florida Counties in Tampa Trade Areas: 1958

(thousands of dollars)

County	Personal Income	Retail Sales	Estimated Purchases	Bought Outside County	60% Local Sales	Total Imports	Percent Basic
Pasco	$ 37,238	$ 20,064	$ 20,927	$ 865	$12,038	$ 12,903	34.65
Hernando	13,988	6,683	7,861	1,178	4,010	5,188	37.09
Citrus	9,050	5,334	5,086	248*	3,200	3,200	35.36
Sumter	12,576	7,576	7,068	508*	4,546	4,546	36.15
Polk	338,637	147,305	190,314	43,009	88,383	131,392	38.80
Hardee	18,500	10,211	10,397	186	6,127	6,313	34.12
De Soto	16,110	7,967	9,054	1,087	4,780	5,867	36.42
Highlands	35,288	16,306	19,832	3,526	9,784	13,310	37.72
Manatee	78,336	44,440	44,025	415*	26,664	26,664	34.03
Sarasota	125,529	62,042	70,547	8,505	37,225	45,730	36.43
Levy	10,922	8,636	6,138	2,498*	5,182	5,182	47.45
Gilchrist	3,422	2,326	1,923	403*	1,396	1,396	40.79
Dixie	5,307	2,961	2,983	22	1,777	1,799	33.90
Hendry	20,979	8,060	11,790	3,730	4,836	8,566	40.83
Glades	5,728	1,364	3,219	1,855	818	2,673	46.67

* Excess sales over purchases.

General Application of Method of Estimating Value of Goods Imported

The method I have illustrated can be applied to estimate the dollar volume of imports, which also measures the dollar volume of exports in any community, by using the following steps:

(1) Estimate the family income of the urban area on basis of Sales Management figures, United States Census data for

census years, value of homes or sample interviews for the year 1958 or any subsequent year in which the retail census is taken.

(2) Secure sales of each type of store in the given urban area and also in the state or nation, from the United States Census of Business for 1958.

(3) Estimate purchases of residents of the urban area by applying percentage of income spent by residents in state or nation in each type of store in 1958.

(4) If these estimated purchases are approximately the same as the retail sales of the community, use the retail sales; otherwise use estimated purchases.

(5) Calculate the cost of merchandise not produced locally at approximately 65 percent of retail sales, or at a ratio obtained by a local survey.

(6) In estimating the dollars for imports of goods manufactured locally, allow only for cost of raw materials shipped in and interest and profits to absentee owners.

(7) Estimate federal income tax payments on basis of 11.9 percent of income of community, unless exact local figures are available.

(8) After deducting from federal income tax payments, allowances for payments to local post office workers and other federal employees in local service, allocate the balance to dollars required to pay for imports.

(9) Total dollar value of imports is the total wholesale cost of retail merchandise delivered at the city plus federal income taxes after deducting federal sums spent locally, and after deducting value added by local manufacturing plants producing for local consumption.

(10) The value of basic activities is equal to value of imports.

(11) Dollars derived from basic activities are calculated by subtracting dollars required for imports from the total income of the community.

(12) Ratio of dollars derived from basic activities to non-basic activities is calculated by ratio between total figures in paragraph 11 and paragraph 9 above.

Needed: A New Policy for The American Indians†

By PETER DORNER*

INDIAN AFFAIRS have commanded the attention of the federal government throughout the existence of the United States as a nation, yet the American Indian is today in the least favorable economic position of all nonwhite minorities in the United States. Implications of evaluation in this area extend beyond domestic policy. The United States is constantly extending its activity in the field of economic development abroad. Problems of economic development associated with American Indians, while unique in many respects, do have some similarity with those encountered in the underdeveloped nations of the world. Cultural differences, high birth rates, low levels of education, poor health, weak and unstable governments are all part of the scene.

This article describes conditions on the Indian reservations, the policies and programs of the Bureau of Indian Affairs (hereinafter referred to as BIA), and makes recommendations for changes needed to improve the economic outlook of the American Indian.

Present Conditions on the Reservations

Population: Growth and Composition. The Bureau of the Census in 1950 reported a total Indian reservation population (including Oklahoma) of 244,906. In that same year the number of Indians on BIA rolls was approximately 400,000. Included in the latter figure are Indians living both on and off the reservation. Thus the former figure of the reservation population is of greatest interest for this study. Complete enumeration for a recent year is unavailable, but where up-to-date estimates could be obtained, substantial growth in population was indicated. The United States Public Health Service reports birth rates among Indians 50 percent higher than for the total United States population.[1] By 1975 the Indian population may be half again what it is today. Half of the Indians in the country are less than 20 years old (in contrast to about one-third of the total United States population). On reservations where large off-migrations have occurred, the proportion under 20 is even greater.

Employment. A much smaller percentage of Indian population is in the civilian labor force than is true of either Negroes or Whites. Indians have a higher rate of unemployment and, as already mentioned, a far higher ratio of children to adults. The last point is significant since it increases the economic burden of the working age population. Most reservation Indians rely on a combination of intermittent, part-time, and seasonal employment supplemented by welfare payments of one kind or another. For example, in 1957 at Pine Ridge, South Dakota, 37 percent of the fully employable population was

† This article is based on the author's PhD thesis, *"The Economic Position of the American Indians: Their Resources and Potential for Development,"* on file at Widener Library, Harvard University, Cambridge, Massachusetts.

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[1] United States Public Health Service, *Health Services for American Indians,* Public Health Service Publication Number 531, Washington, D. C., 1957.

unemployed. At Standing Rock (North and South Dakota) a 1955-study found 59 percent of the available manpower unutilized. The Navajo in 1955 received over 16 percent of all individual incomes in the form of welfare or unemployment compensation. In Wisconsin it is estimated that Indians receive over seven times as much public assistance aid in proportion to their total numbers as does the general population.

Resources. In 1873 Indian lands totaled 150,000,000 acres. Today there are only slightly over 50 million acres of land under Indian control—only two-thirds of them operated by Indians. The remainder are either leased to non-Indians or idle. Even if all the idle land and that presently used by non-Indians were operated by Indians and all potentially irrigable land were brought under cultivation, resources on most reservations would still be wholly inadequate to support the present population. The ratio of employment opportunities to the number of reservation families is about 45-50. On some reservations this ratio is much less favorable.

Minerals (especially oil and gas) and timber have been lucrative sources of income for some tribes in recent years. But this increased wealth has not altered greatly the structure of economic opportunities open to individual Indians. Mineral and timber resources are concentrated on about a half-dozen reservations where much of this income has been used to finance functions previously performed by the BIA (welfare, police and security, resource surveys, etc.). Some of the income is paid to individuals on an annual per capita basis. This is undoubtedly a welcome addition to the family income but, by and large, it is spent on current consumption. Seldom has it given the individual any experience or new capacity for increasing his earning power in the future. Yet this capacity to live and work under the competitive processes existing in our industrial society is the greatest need of the Indians of today.

Land Tenure. Much reservation land is interspersed with non-Indian owned land. Much of the land, especially in the Northern Plains, has been allotted to individuals. Many of these allotments date back to the years following the General Allotment Act of 1887. As individuals gained control they often sold land to non-Indians, leaving a checkerboard pattern of Indian land holdings. Even the units which have not been sold are often subject to multiple ownership claims. When the original allottee died, his land passed to his heirs who then held equal but undivided interests in it. With the death of the second generation the number of claimants to one parcel of land again increased. The difficulties posed by these tenure problems are beyond the ability of an individual or often of a tribe to solve.[2]

Farm and Ranch Units. Under present conditions a 100-cow beef herd can, with good management, yield a family income of $3,000-$3,500. Few Indian ranch units are this large. At the Fort Peck reservation in Montana, over 80 percent of Indian ranchers have less than 100-cow units. Only 14.2 percent of the reservation Indians in North and South Dakota own any cattle. Of 7,499 Navajo families with grazing permits on their reservation, only 445 earned more than $1,500 per year from farming and stock raising. Where figures are available the evidence is that Indian farmers produce only

[2] United States Comptroller General, *Administration of Indian Lands by Bureau of Indian Affairs*, Washington, D. C., 1956.

about one-half or less per acre or per livestock unit as their non-Indian neighbors.

Social Conditions. A fairly large number of reservation Indians are not equipped culturally to move successfully into the non-Indian economy. Tribal governments are often weak, unstable and ineffective. General health conditions are still far below those of the general population. Educational achievement is inadequate. As recently as 1952, 23 percent of all Indian children of school age were not enrolled in school. For Navajo children the figure was 50 percent. This has been greatly improved. By 1957 the corresponding percentages were 6 and 11. Indian people face many problems in their struggle for economic progress. Few of them have experienced the effects of a steady job. Their managerial skills are not developed. Population growth puts a continuing strain on the economic position of those remaining on the reservations.

A Critical Review of BIA Policy and Programs

Unfortunately, BIA policy has given insufficient attention to many of these problems. The Commissioner of Indian Affairs from 1953 to 1960 emphasized repeatedly that his objectives were to provide adequate health and educational facilities as well as economic opportunities for all Indians. Magnificent progress has been made in the area of improved health. This was due largely to the transfer in 1955 of Indian health programs from the BIA to the United States Public Health Service. Although major problems continue to exist, there has been much progress in providing Indian children with more schools. This has been an achievement of the Bureau of Indian Affairs. But economic development on the reservations has been badly neglected. There are no plans to speed up the development and use of irrigable land. There is no program to get Indians established on farms and ranches large enough to provide a good living. There is no program to solve the problems of land tenure, poor resource management, and inadequate credit. In fact, the BIA is withdrawing from the fields of agricultural extension and credit.

Yet the BIA does have a program which it labels economic development. Major emphasis here is on relocation of reservation Indians in cities and on getting industrial enterprises established on or near the reservations. These programs have been of some help but they are inadequate to the task. Furthermore, they actually amplify some problems on the reservations.

Relocation of Indians to the cities has been subsidized by the Bureau since 1952. In 1957 an additional feature was added—the adult vocational training program. Relocation efforts are directed mainly at 18 to 35 year olds. Ordinarily, too, those in that age group having at least some high school education and some training in a skilled trade are the most likely to establish themselves successfully in the city. But many Indians return to the reservation—an estimated 25 to 30 percent. Of Indians relocated to Chicago in 1957, 36 percent returned to their reservation within that year. The corresponding rate for St. Louis was 42 percent. There is also evidence that the rate of return has been increasing. This increase suggests that the latter-year relocatees were less well adjusted and/or trained for city-industrial life than those of earlier years. In a July 1958 BIA news release, the Commissioner of Indian Affairs stated:

"Over the past six years I feel certain that we have been providing relocation assist-

ance very largely to the better educated and more skilled members of the population on the reservations. Veterans of World War II and Korea and other Indians who have had considerable experience off the reservations or who have acquired specific job skills have naturally been among the first to come forward in seeking relocation assistance. Today I suspect that the great bulk of people in these categories who have any interest in relocation have already made the move. So we are getting down to a level of people who are very largely without specific job skills and, in many cases, without very much even in the way of ordinary schooling. This means, of course, that we will be facing a considerably more difficult and challenging job than ever before in helping these people to find suitable employment either in the relocation cities or in the near vicinity of the reservation."

Movement off the reservation had, in fact, been going on for a long time before the Bureau relocation program began, especially in the Northern Plains States. It is highly significant to note the consequences of this movement to the population composition of those remaining on the reservations. For all Indians from reservations in North and South Dakota the off-reservation population has almost 59 percent in the 19-49 year age groups. The on-reservation population has only 33 percent in these ages. But these are the people who must develop and operate the reservation resources if they are ever to be effectively used by the Indians. Shrinking of this age group has several consequences. First, by greatly reducing the productive work force it increases the burden of supporting the non-productive part of the population. Second, and perhaps more significant, the reservation population tends to become a concentration of poorly adjusted, demoralized individuals, many of whom cannot be helped except through very intensive guidance and counseling efforts. Most tragic of all, young people find a diminishing number of their own adults who can provide, by example or outlook, a promising standard of identity for youthful aspirations. For many people presently on the reservations, self-improvement will be next to impossible. A long history of degradation and humiliation reflects itself in a serious inability to adjust to the rules and procedures of the non-Indian culture. For example, in South Dakota where less than 4 percent of the total population is Indian, 33 percent of the inmates of the state penitentiary are Indians. About 40 percent of the families on the aid-to-dependent-children program are Indian.

Shifting these serious problems of personal or social adjustment to the cities, through relocation, would be extremely unwise. Besides accentuating the problems of crime in the cities it would certainly be harmful to future acceptance of Indians in industrial employment. This is an important consideration since there is already an unfortunate prejudice against Indians as being shiftless and unreliable on the job. In spite of the above problems, the relocation program in many areas is necessary if economic conditions are to improve on the reservation.

But the Bureau must view this program realistically and not blind itself to its definite shortcomings and the way it increases the problems on the reservations. The Bureau does not caution against these possibilities. Relocation, adult vocational training, and vocational training in high schools for off-reservation employment are all directed at the young, vigorous and better-adjusted segment of the population. All have movement of people off the reservation as their objective.

Where is the trained reservation population, so vital to improvement of reservation conditions, to come from? Poverty

on the reservations and all its accompanying ills will continue indefinitely unless these programs are accompanied by an intensive managerial training program, adequate long-term loans and grants, and a solution to the land tenure problems.

The Bureau recognizes full well that relocation is not the total answer. Industrial developments near the reservations have also been emphasized. This program was formally initiated in the summer of 1955. It is a sincere effort to provide Indians with employment opportunities. But to date it has not been highly successful in attaining this objective.

The Bureau is not concentrating on industries that utilize local resources other than labor. One spokesman for the program commented as follows: ". . . in each type of industry, we have attempted to hold to production that would not require transportation, that would not require an immediate market, because we know our Indian communities were not located under such circumstances."[3] Most frequently mentioned as prospects are electronic firms, since their freight charges on both raw materials and finished products are a relatively minor factor while labor makes up a large fraction of total costs. However, such areas as New England have, at present, a considerable advantage over areas more remote from the industrial centers, as are most Indian reservations.

Two relatively successful examples cited by the Bureau are the Turtle Mountain Ordnance Plant at Rolla, North Dakota, and the Simpson Electric Company at Lac du Flambeau, Wisconsin. The plant at Rolla is a branch of the Bulova Watch Company manufacturing jewel bearings. It was established under a contract with the Department of the Army in October 1952. Practically its entire output has been purchased and stockpiled by the government. It is a special case resembling more nearly a government than a private operation. The Simpson plant was established by a Chicago manufacturer on his own initiative in 1946. This man had spent some summer vacations in the area and became interested in the problems of Indian employment. This, apparently, is a case of philanthropy. Except for these two rather exceptional cases, there have been few successes to report. The overall prospects of this program cannot be determined until the Bureau makes studies that will indicate specific possibilities. The Bureau recognizes the need for such studies but it has done nothing to initiate them. In 1957 the Commissioner stated: "I am hoping . . . to get private foundations to make grants to conduct . . . surveys on various reservations, not only of the material resources, but the human resources, too."[4]

I believe the Commissioner has in mind broad studies covering all the economic possibilities of reservation land, timber, and mineral resources as well as the prospects for establishing industrial enterprises and expanding adult vocational training and relocation. These studies are urgently needed. But reliance on private foundations may result in costly delays. It is properly a responsibility of the Bureau. The reasons given by the Commissioner for reliance on private funds appear irrelevant: "If I can get foundations to put up this money, it would save the Government the required

[3] United States Congress, Senate, *Hearings on Federal Indian Policy*, Subcommittee on Indian Affairs of the Committee on Interior and Insular Affairs, 85th Congress, 1st Session, 1957, pp. 255–257.

[4] *Ibid.*, p. 204.

money, and that would be excellent. But one of the main things is that I want to be sure that the companies that conduct these surveys are the best in the country, the best that can be employed."[5]

A member of the Subcommittee on Indian Affairs, Senator Barry Goldwater from Arizona, had expressed extreme pessimism earlier about conducting these studies within the Bureau—in fact, within the federal government. He said: "You want an economic study, and the Government is not prepared to do it, in my estimation. I don't know anybody competent to make that kind of study who is working for the Government."[6] The Commissioner's statement would seem to agree with the Senator's appraisal. Since the Bureau is without an economic staff, they are probably correct. But need one remind them that private foundations hire research workers from the same market as is accessible to the Bureau and the federal government?

Some of the industries that have been established under this program have run into difficulties. A study made by the Comptroller General's office points out: "Our review disclosed a lack of adequate planning in advance of negotiations for establishing industrial development projects. We noted also that as of March 1958 the Bureau had not established written criteria for use in negotiations with industries."[7]

Two plants established near the Navajo reservation in 1956 were heavily subsidized. "In adopting a policy of removing every obstacle which might stand in the way of attracting outside firms, the tribe and the Bureau have made it easy for these firms to withdraw from operations. Arrangements with the two firms did not require the enterprises to invest in plant or fixed equipment. Also, neither firm bore the full labor costs and did not agree to hire for minimum periods."[8] The two firms in question are Lear-Navajo and Navajo Furniture Industries, Inc. Lear Inc., an electronics firm of Santa Monica, California, established the Lear-Navajo plant at Flagstaff, Arizona in November 1956. The Baby Line Furniture Company of Los Angeles, California, established the Navajo Furniture Industries, Inc., at Gallup, New Mexico, also in November 1956.

The Comptroller General's report states: "Although the Bureau estimated that after one year of operation each of these plants would employ 100 Navajos, Bureau records show that prior to November 1957, the Lear-Navajo plant had ceased operations and that as of November 8, 1957, Navajo Furniture Industries, Inc., employed only 10 Navajos."[9] And so it has been with most other ventures. The Bureau has expressed great optimism over the possible accomplishments of this program but there has been little accomplishment in fact.

Another example: In March 1957, the Parsons and Baker Manufacturing Company of Phoenixville, Pennsylvania, established a garment factory (Casa Grande Mills, Inc.) at Casa Grande, Arizona. It was expected to employ 125 Pima and Papago Indians immediately and 700 ultimately. In July 1957 a Bureau spokesman testified before a Senate Committee: ". . . If we go down to Casa Grande in Arizona, where a garment factory is already operating under an agreement with us, whereby they will employ Pima and Papago women, and their plans

[5] *Ibid.*, p. 261.
[6] *Ibid.*, p. 204.
[7] United States Comptroller General, *Administration of Withdrawal Activities by Bureau of Indian Affairs*, Washington, D. C., 1958, pp. 40–42.
[8] *Ibid.*
[9] *Ibid.*

are up to 350, which is 350 families, it is going to go a long way to solve the employment problem of those two reservations, in addition to all the other employment that is available."[10] In August 1958, on my visit to this plant, I was informed that they had, in their 17 months of operation, at one time or another employed seven Pima women. As of August 19, 1958, they were employing one Pima woman. The entire labor force of the plant is about 75.

In view of the uncertainties and the difficulties involved, one wonders whether the money here spent would not yield much more if invested in the development of agricultural opportunities. Success is not certain there either but the possibilities are much more clearly defined—especially on reservations where substantial agricultural and ranching developments in terms of Indian operations could be accomplished. Three elaborate economic studies for individual reservations have been made by private research organizations hired by the tribes.[11] They all agree that first emphasis should be given to land and other local resources. The industries they recommend are those which could utilize these local resources. None of these studies are optimistic of establishing "outside" industries.

Philosophy Underlying BIA Programs

Bureau policy reflects a history of failures, due to past inadequate attempts, of economic development on the reservations. In 1928 a thorough study of Indian Affairs widely known as the Meriam report stated: "Even under the best conditions, it is doubtful whether a well-rounded program of economic advancement framed with due consideration of the natural resources of the reservation has anywhere been thoroughly tried out."[12] This statement is applicable today with only a few exceptions where tribes have recently obtained money to carry out their own rehabilitation program. Indians, though not always specific and articulate in their demands, are virtually unanimous in their feeling that reservation resource development should have first priority.

What are we to conclude? Is the BIA staff incompetent? Or is it conscientiously engaged in an effort to wrest from the Indian his resources? I would answer both questions in the negative. The BIA is staffed with people competent in their individual professions. They are to be commended on the progress made in the fields of education and welfare. Without ignoring limitations it should be recognized nevertheless that relocation and industrial development can also be useful. Development of reservation resources is mentioned but here is a very wide gap between stated objective and actual activity and accomplishment. Why this gap?

The particular program emphasis can be understood only in light of BIA philosophy. This can be best expressed in terms of five major ideas. The first is the idea of terminating federal service to Indians expressed in House Concurrent Resolution 108, 83rd Congress, First Session, August 1953:

[10] *Hearings on Federal Indian Policy, op. cit.*, p. 256.

[11] One study was conducted by the Doane Agricultural Service, Inc., of St. Louis, Missouri, for the Fort Berthold Reservation in North Dakota. The other two studies were carried out by the Stanford Research Institute, Menlo Park, California for the Jicarilla Apache and the San Carlos Apache Reservations in New Mexico and Arizona, respectively.

[12] Quoted in Felix S. Cohen, *Handbook of Federal Indian Law* (Washington, D. C.: Government Printing Office, 1945), p. 27. A revision of Cohen's book was published by the United States Department of Interior, *Federal Indian Law* (Washington, D. C.: Government Printing Office, 1958).

". . . It is the policy of Congress, as rapidly as possible, to make the Indians within the territorial limits of the United States subject to the same laws and entitled to the same privileges and responsibilities as are applicable to other citizens of the United States, to end their status as wards of the United States, and to grant them all of the rights and prerogatives pertaining to American citizenship. . . ."

Since the passage of this resolution Congress has become concerned with some of its awkward implications, especially after the problems created by termination programs for the Klamaths of Oregon and the Menominees of Wisconsin.

Yet, within the Bureau every move must stand the test of whether or not it is in line with this expressed "mandate" from Congress. Transfer of children to public schools, transfer of agricultural extension to the states, greater reliance on outside sources of credit—these, one is frequently reminded, are consistent with the general policy of reduction and eventual termination of federal services to Indians. The policy implied by this resolution has created great uncertainties for the Indians, especially since Bureau personnel use it to justify or oppose programs.

The second idea which influences the actions of the Indian Bureau is that reservation resources are inadequate to support the population now living there. Population on most reservations is indeed excessive in relation to available resources. As a result there is an impulse to view the imbalance as so severe that a program to develop these resources is never seriously considered. BIA personnel seem much more impressed with limitations of resources on the reservations than with their potentialities. Yet surely the adequacy of reservation resources is not a pertinent and forceful issue until all the resources are fully developed *and used* by Indians, or at the very least until programs are under way to accomplish this end. Bureau personnel, however, are spared this task of reconciliation by the third major premise in Bureau philosophy, which is that Indians cannot be trained to work the land. This attitude is typified by such expressions as "these people don't want to farm" or "you can't make a farmer out of an Indian." It is an attitude frequently expressed at all levels of administration within the Bureau and is very influential in shaping present policy. A former educator within the Bureau has said:

> "This need to prepare Indian children to use their own land ran smack into that prejudice within the Indian Service which held that Indians could not be trained to use land. Because untrained Indians had not in one or two generations accomplished a complete transition to cattle raising or farming from a culture which had assumed that a man's place was that of a fighter and hunter, it was argued that Indians could not make the transition. Why these same critics should have assumed that Indians could more easily adjust to the building trades, the mechanical trades, or commerce, all of which are even further divorced from the earlier culture pattern, is not clear."[13]

The fourth idea underlying Bureau philosophy explains why no sufficient effort has ever been made to enable Indians to develop successful farm and ranch units. It is the idea that the conservation of physical resources is an end unto itself. Conservation is viewed in a purely physical and rather primitive way. A recent *Range and Forest Management Report* of one of the Bureau field agencies begins with this statement: "The management of Indian trust lands must be guided by, or conducted within, at

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[13] Willard W. Beatty and Associates, "Planning the High School Program," in *Education for Cultural Change* (Washington, D. C., United States Department of Interior, 1953).

least two objectives. The first obligation is to the land. . . . The second management objective is adequately defined by the phrase 'Indians first for Indian lands.'" Ironically, this report pointed out that on the very same reservation under consideration there are 75 range units operated by Indians and 206 by non-Indians. Economic progress for the Indian is obviously not the first guiding principle. Conservation has been a more influential objective than Indians' welfare and development. Bureau employees frequently point out that the productive potential of the land is more fully realized when operated by non-Indians. They do not appear to visualize the possibility that the land might serve as an instrument to promote human development and adjustment, even if producing at less than maximum potential.

Fifth and finally, the Bureau's concept of economic development is inadequate. Economic development appears to be conceived as a stop-gap emergency measure rather than a long-run, well-planned process of increased productivity. As an example, 10-year development plans submitted by the field agencies of the BIA in 1944 (but never acted upon) were designed primarily to have public works programs available in the event that depression followed the war.

In 1958, with rising unemployment, fear of depression again turned attention to prospects of public works programs. Field agencies were again urged to compile estimates of works to be performed. This was not as elaborate as in 1944, but rather asked only for a report of the number of potential water-retaining structures that might be constructed on the range lands. This report did not answer (or even raise) several questions of overwhelming importance—questions which should be explored before action is taken. What would be the cost of these structures? By how much would these structures augment the productivity of the range lands? How would existing or potential Indian ranch units be affected? How does the productivity of such investments compare with other investments that might be made—for example, in managerial training of Indians? Should these structures be completely developed before investment funds are diverted to other purposes? What system of investment priorities should be followed? What economic opportunities for reservation Indians would be provided?

The fact that these questions were never raised points up the major deficiency in the BIA's concept of economic development. Had economic development been viewed as a process of investment with a system of priorities, indicating the order of these investments, *all* for the purpose of creating economic opportunities for Indian people, such questions would become the center of the analysis. With such analysis, reservation by reservation, first emphasis could then be given to those areas in which the obstacles to change and improvement are greatest—land consolidation, management training, education, credit, and the like. As some of these limitations are modified, areas lower on the original scheme of priorities become the most limiting factors.

Consequences of an Inadequate Concept of Economic Development

Because they lack such an integrative concept of economic development, the programs of the various branches within the Bureau are unconnected. Each is appraised in isolation rather than evaluated in terms of consistency in working toward a common objective. Take, for example, the following statement: "More

sources of financing are now available to Indians, and their economic activities are probably more adequately financed than at any time in their history," which appears in the testimony of one Bureau official before a Senate Committee.[14] In view, however, of the abysmal inadequacy of past financing, the statement is not very revealing. Truly, nothing *but* improvement was possible. The impression generally given is that the credit problem is no longer serious. As a consequence, the Bureau is contracting its lending operations and placing major emphasis on "regular" sources of credit for Indians.

Yes, from the viewpoint of a lending agency, the conclusion that available credit is "adequate" is not unreasonable. Few Indians today could meet the security requirements of a private lender for a loan of the magnitude required to establish an efficient-sized farm or ranch. They could not qualify under the traditional three C's—character, collateral, and capacity. Since these three elements are "givens" in the situation, the alteration of which is no direct concern of the private lender, the conclusion of adequacy is a perfectly good one—for the private lender. But it is by no means a warranted conclusion for the Bureau. If the Bureau were engaged in a serious program of economic development, its chief function should be to *alter the "givens"* in the situation. A private lender's objective is to make money and protect the interests of his depositors. But the Bureau's objective should be to develop economic opportunities for the Indians and to enlarge their capacity to exploit these opportunities.

Another example: In education, both in high school and adult vocational training, emphasis is on training for off-reservation employment. Indian boys, it is said, express no desire for agricultural training and occupations. The boys, of course, reject agriculture because under present circumstances they cannot establish a sufficient-sized unit on the reservation nor cope with financial and land tenure difficulties. The educator takes the expressed desire of the boys as a given element in the situation. He is in no position to alter the structure of alternatives where the reservation resources are concerned. As a consequence, some of the agricultural departments in Indian schools are being discontinued.

Agricultural extension work has largely been transferred to the states. Extension efforts have never been adequate, even when the Bureau had complete charge. But transfer to the states has created additional problems of inadequate staffs and frequent turnover of extension workers. Here again, viewed in isolation, extension efforts may appear sufficient. Extension work can only be effective if farmers have the necessary financial means to put into practice the new ideas provided by extension. In most cases the farms and ranches are hopelessly small and need additional long-term financing to expand operations. Therefore, to make additional extension personnel effective would require a greatly expanded loan program and a solution to the land tenure problems. But this is again outside the jurisdiction of the branch responsible for extension work.

There are investments that could be made in reservation resources which would increase the productivity and general efficiency of operation. But as a high Bureau official in one of the field offices candidly revealed: "There is no sense in making these investments since the man-

[14] *Hearings on Federal Indian Policy, op. cit.*, p. 250.

agerial capacities and skills are not available." One sees the circuitous reasoning. Investments are not justified since management is not available; without the requisite investments and land reforms it is useless to train the managers—and so on. The circle is never broken.

With this operational philosophy, the three vital problems of land tenure, poor management, and lack of credit cannot be solved. The Indians are not using their land, there is no managerial skill available, under present conditions they are not credit-worthy, the land base is inadequate in any event, etc., etc. This is the despairing dirge chanted by the Indian Affairs staff, with the final chorus that Indians simply cannot develop the capacities required to operate a successful reservation economy. And it all hinges on the assumption that present circumstances cannot be altered.

Alter present circumstances and the "logic" becomes ridiculous. Those justifications sound true in isolation without an appraisal of the possibility of changing the limiting factors in each case. But conceived together they present an incoherent picture: completely separated groups pull in different directions with the result that movement to a new economic level is impossible. In each branch the justifying assumption is that all other things remain unchanged and *unchangeable*. Remove this assumption, and present programs are manifestly inadequate.

A Program for the Future

The problems on Indian reservations require a simultaneous attack on many fronts with emphasis on education and upon economic development of the reservations. Many adjustment difficulties lie in the realm of ideas and beliefs and cannot be overcome by mere acquisition of skills. More emphasis must be placed on academic subjects with special attention to the economic functioning of an industrial society and the requirements for success in it. Land tenure problems must be solved, primarily by tribal purchase of allotted lands and the establishment of farms and ranches large enough to pay off. Range lands must be fully developed; irrigation construction has to be accelerated. Equally important are intensive managerial training programs for Indians who operate the reservation resources. Capital grants and credit must be made available to them. Provision must be made for those who cannot be accommodated on the land. More adequate housing and health services have to be provided.

The Bureau, in conjunction with the Indian tribes, should employ an economic staff to work out detailed plans for economic development with due consideration for the interests and capacities of the people. These plans must determine specifically what the alternatives are, what the priorities of investments should be, how such investments are to be protected (obligations and responsibilities of the several parties, provision of training and supervision, etc.) and how land tenure arrangements can be altered to sustain such developments. This must be done on an individual-reservation basis and is necessary before any request is made to Congress for the substantial appropriations that will be needed.

No one can do this planning for the Bureau. It must do this job itself rather than rely on outside private foundations. Unless the Bureau has the staff and adopts the requisite philosophy for carrying out such plans, they will not be useful. In a recent year the Commissioner "took a five-month trip to try to meet with the three top elected officials of every tribe in the country, to ascertain

from them what they wanted." Such personal effort on the Commissioner's part is certainly to be applauded. But let us remember that what people "want" can be meaningful only when it is related to the possibilities, the alternatives that exist or that can reasonably be created. At present, many Indians may not only *be unaware of what they want* but very likely *do not know what they have!* Undoubtedly, they want improvement—something better. But it will require skillful assistance in analyzing the present resource situation to determine the feasible alternatives. Only then, after they understand these alternatives, will it be fruitful to ask what they want.

Some of the old Indian values will have to change if the Indians are to achieve economic success in our industrial society, and age-old customs and values are not easily given up. Change in goals and values depends on knowledge of the means available for their fulfillment. Goals are in the realm of fantasy without understanding of the physical, financial and human potentials, as well as their limitations. Thus it is meaningful to ask people what they want only if they are familiar with the major alternative courses of action open to them and the consequences reasonably to be expected.

Programs must be evaluated in terms of future generations. Today's children will find it hard to break with the tradition of poverty unless they have stable homes encouraging regular school attendance and the beneficial example of steady parental employment and economic decisions. Improvement depends on Indian use and management of land —the major available resource that can provide such stability. The land resources should therefore be viewed as an instrument for promoting human adjustment.

Congress must realize that the alternatives are rather limited and that any course will be costly. Present Bureau budgets are over $100 million annually. They will grow steadily larger unless economic development programs are undertaken. So long as reservation developments are slighted, any major improvement in the "Indian Problem" is doubtful. Even with such programs, it is a delusion to expect the problems to be solved quickly. Populations living a long time under conditions of poverty and humiliation will not immediately respond to alternatives that "look good" to outsiders.

We have little experience in this task of converting a population with a history of poverty and primitive rural values into successful performers in an industrial society. Historically, such rapid changes have taken place only under compulsion. But we can be more charitable. It may take another generation or two even with a vigorous program of economic development. But such a program, though expensive, will ultimately be the most economical—and the most humane—Indian policy we can follow.

Reports and Comments

WHO OWNS THE CITY?

Data and Implications from San Francisco Experience†

ALTHOUGH two-thirds of America's estimated national wealth is in the form of land and improvements[1] and many of the great fortunes in this country have been invested in urban real estate, little is known about who actually owns urban property. As Leo Grebler has pointed out, "no information exists on who owns urban income property—the number of owners, or the type of owners by legal and other characteristics."[2]

This study asks and will attempt to answer a number of questions regarding the significance and characteristics of ownership groups in urban property. First, who are the major ownership groups in the central business district and among other important properties in the city? Second, is there any significant difference between the ownership groups of such property when classified by legal record or when classified beneficially as to actual ownership? Third, what are some of the implications of such ownership findings? These questions are studied in the context of San Francisco experience in the post-war decade (1947–48 to 1957–58).

Ownership by legal record is the ownership in which name the property is recorded. This could also be called simply nominal or record ownership. It is this type of data which can be obtained from public records and generally provides what little ownership information is available. Beneficial ownership is actual or real ownership. The beneficial owner is the one who has the right to enjoy the benefits accruing from the property—although the title to such property may not be recorded in his name. (For specific definitions of the various ownership groups, see Addendum following this article.)

In answer to the second question, there are some very important differences between legal and beneficial owners once the "corporate veil" has been pierced. Tables I and II reveal directly that the relative importance of such ownership groups as estates changes widely once the various "legal veils" hung over property ownership by corporations, title companies, and trust companies have been lifted. Due to the difficulties and expense involved in attempting to ferret out beneficial ownership there appears to be no such published data for any major city in this country. This study hopes to rectify this situation by presenting data on both legal and beneficial ownership groups for San Francisco.

When Tables I and II are compared it becomes obvious that certain ownership groups are more effectively obscured than are others. By legal classification (Table I) estates rank next to the bottom of the list in relative importance as an ownership group. Thus they appear to be relatively insignificant owners of urban land. When, however, beneficial (or actual) ownership is obtained (Table II), estates are no longer next to the bottom of the list but appear next to the top—with 19% of the properties in the study held by them.

By legal ownership (of record) estates hold only 6% of the property under study but by beneficial ownership they own 19% —a percentage difference which causes im-

† This article is part of a larger study financed by the Land Economics Foundation and the Real Estate Research Program of the University of California at Berkeley.

[1] Raymond W. Goldsmith, *Studies in Income and Wealth*, Vol. 4 (New York, New York: National Bureau of Economic Research, 1951), Part I, pp. 20–36.

[2] Leo Grebler, *Housing Market Behavior in a Declining Area* (New York, New York: Columbia University Press, 1952), p. 95.

portant changes in the relative position of estates compared with other owners. Comparison of Tables I and II reveals other important differences in ownership as measured by legal versus beneficial ownership. Depending, therefore, upon one's purpose it may be of considerable importance which type of ownership data is used in talking of urban ownership. In many cases, certainly, justification can be made for the expense of collecting beneficial data. The assumption that legal ownership would be relatively the same as beneficial ownership in all (or even most) cases is not justified by the results of this study. Of course this implies the warning that arguments involving ownership of urban land may sometimes be misleading if only legal ownership data is presented—as is usually the case.

Concerning the first question: Who are the major ownership groups within the city, Tables I and II point out that individual owners predominate in total numbers both by legal and beneficial classifications. By legal classification, individual ownership accounts for nearly a quarter of all properties. By beneficial analysis the percent of total individual owners rose even higher—to 29%. Moveover, when the assessed value of properties is considered (as noted in Tables I and II) the highest concentration of individual ownership is among the less valuable properties (those assessed at under $250,000)—37% and 41% for legal and beneficial ownership definitions, respectively. On the other hand, when the more valuable property is considered it appears that individuals are relatively unimportant.

As has been noted, the relative importance of estates as an ownership group is not revealed by legal ownership data. Beneficial ownership indicates that estates are not only the second most important group in total size within the study, surpassed only by individuals but, when the more valuable property is examined (that assessed at over $250,000), estates are by far the largest own-

TABLE I—Legal Ownership Groups as Classified by Area, Assessed Value, and Sales Activity

(*percentage rounded*)

Legal Ownership Group	Total Number of Properties by Group	% of Properties by Group	Ownership in Central Business District Assessed at		Ownership Outside the Central Business District Assessed at over $250,000	Sales Activity % of Properties Sold 1947-8 to 1957-8
			over $250,000	under $250,000		
Individuals	192	24%	7%	37%	3%	40%
Realty Corporations	163	21%	32%	17%	20%	29%
Corporations (non-realty and non-financial) Own Use and Other Than Own Use	138	18%	16%	10%	39%	36%
Two or More Individuals	106	13%	9%	18%	3%	30%
Financial Institutions Own Use and Other Than Own Use	105	13%	23%	10%	14%	40%
Estates	44	6%	10%	6%	3%	21%
Other Institutions (nonfinancial)	40	5%	3%	3%	18%	24%
Total	788	100%	100%	101%	100%	.....

ership group. Thus in the heart of the city under study it appears that estates are the major real owners of the most valuable properties. This finding is one that the more easily available legal ownership data gives no indication of—as can be seen from Table I.

Tables I and II indicate the relative importance of other ownership groups as well. For instance, corporations of the non-financial and non-realty variety are the third most important ownership group by both legal and beneficial data. Such ownership groups as realty corporations, it is noted, become less important in total ownership when analyzed by beneficial rather than legal ownership data (moving from second in importance by legal data to sixth place by beneficial analysis). Tables I and II list ownership groups by relative importance as to percent of total properties owned.

Sales activity of the various ownership groups provides further illumination about their characteristics and behavior. Differences in sales activity between various types of owners are shown in Tables I and II. It is very clear from the data that investors in real estate have different and distinct patterns of market behavior. If beneficial (or actual) rather than legal ownership (of record) is considered, wide differences appear in sales activity patterns. While 34% of the entire group (788 properties) were sold, the percentage of properties sold in the period

TABLE II—BENEFICIAL OR ACTUAL OWNERSHIP GROUPS AS CLASSIFIED BY AREA, ASSESSED VALUE, AND SALES ACTIVITY

(*percentage rounded*)

BENEFICIAL OWNERSHIP GROUP	Total Number of Properties by Group	% of Properties by Group	Ownership in Central Business District Assessed at		Ownership Outside the Central Business District Assessed at over $250,000	Sales Activity % of Properties Sold 1947-8 to 1957-8
			over $250,000	under $250,000		
Individuals	225	29%	12%	41%	5%	39%
Estates	148	19%	31%	16%	12%	19%
Corporations (non-realty and non-financial)						
Own Use	106	13%	14%	7%	34%	31%
Other than own Use	28	4%	3%	4%	2%	64%
Two or More Individuals	88	11%	6%	15%	2%	32%
Financial Institutions						
Own Use	43	5%	10%	4%	7%	21%
Other than own Use	32	4%	8%	3%	4%	56%
Realty Corporations	52	7%	12%	3%	14%	46%
Other Institutions (non-financial)	47	6%	3%	3%	19%	23%
Not Available	19	2%	less than 1%	3%	1%	44%
TOTAL	788	100%	100%	99%	100%	....

ranges from a low of 19% for estates to a high of 64% for corporations holding property for other than their own use. Estates, individuals, financial institutions, and corporations all seem to present distinct sales activity patterns of their own. Estates, for example, are generally quite inactive in the real estate market—seldom selling properties and buying usually only in periods of depression. Corporations and financial institutions owning property for other than their own use, and realty corporations when beneficially analyzed, are the most active participants in the market. Thus property held by such owners is apt to change hands much more often than property owned by estates. Distinct patterns of ownership behavior are thus seen to emerge from the sales activity data.

Some of the implications of the ownership and sales activity data (our third question) are indicated when the beneficial ownership groups are studied along with their sales activity patterns. This study indicates that certain ownership groups have considerably higher sales activity among their properties than do other groups. Thus when one group is a large owner of property in a particular area with a low record of sales activity among its holdings, as is the case with estates, such areas in San Francisco's experience tend to be relatively static as to construction and new development. The resulting general unavailability of property in the traditional business district can be cited as an important factor in the developing in San Francisco of adjacent "New Business Districts."

In the case of San Francisco it has been the corporate (financial and non-financial) owners who have contributed most in the post-war era, to the development of both the central business district[3] and the city through new buildings, with their concomitant increase in tax revenue. Estates, on the other hand, accounted for relatively little new construction, even though they held sizeable amounts of property in the old business district as well as in peripheral areas where new construction was active. Organizational and motivational elements appear to be the most likely reasons for such behavior.

This study suggests then that different types of property owners have a decided effect on the mobility of resources in the market. Cities attempting to redevelop rundown areas, or hoping to keep the concentration and intensity of uses high within their traditional central business district, will probably find certain ownership groups, such as financial and non-financial corporations and certain investment realty companies of the most aid in such attempts. Unfortunately, these are not always the largest ownership groups.

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Definitions as Used in This Article

Legal Record Ownership Definitions

The classification of legal ownership groups is based upon data obtained from public record in the San Francisco City Assessor's Office. Legal ownership may or may not be identical with beneficial ownership. The legal classifications here are based upon those used by Leo Grebler in his *Housing Market Behavior in a Declining Area.* (New York, New York: Columbia University Press, 1952), Appendix I.

Single Individual. Cases in which ownership is recorded in the name of one person or in the names of a husband and wife listed as joint owners of record. No economic importance attaches to a separate classification of husband-wife cases since California accepts the community property law.

Two or More Individuals. Cases where two or more persons, other than husband and wife, are owners of record, regardless of the legal character of the joint tenancy —excluding, of course, estates, corporations, and institutions.

Estates. An estate, legally defined and as used here, is a classification applied only if specific language in the conveyance record

[3] The Central Business District in San Francisco is defined here as including all property fronting Market Street on the south and all area north of Market Street bounded by Sacramento to Montgomery, south on Montgomery one block to California, west on California one block to Kearny, south on Kearny one block to Pine, west on Pine one block to Grant, south on Grant one block to Bush, and west on Bush to Mason, then south on Mason to Market again.

indicated such ownership, the determining words being "executor," "administrator," and frequently "trustee," or even where title was recorded as a particular estate.

Realty Corporations (or *Realty-Investment Corporations*). Generally has the title "realty corporation" or "realty holding corporation" in the title, may include family as well as other holdings in corporate form.

Non-realty Corporations (or just *Corporations*). Business firms, generally excludes public utilities, in contrast to Grebler's classifications for New York. In most cases the corporate title makes the classification self-evident. In other cases an investigation of the company itself is necessary to determine the type of business. Property held by non-corporate firms would be listed under the classification, *Two or More Individuals,* or *Single Individuals, Other Institutions* (or *Single Individuals, Non-Financial Institutions*). Includes religious, educational, hospital, and fraternal and social welfare organizations. *Financial Institutions.* Includes property owned by banks, insurance companies and savings and loan associations. Whenever a bank or trust company owned property in trust for a beneficiary, the beneficiary was considered the owner, not the financial institution.

Beneficial (or Actual) Ownership Definitions

Actual or residual ownership. These definitions of ownership are of basic concern in this study since this type of data has been largely unavailable.

Individual Owner. Not only single individuals, and husband and wife, but corporations that are merely legal conveniences for individual investors. Determined by examination of the individual property and the conditions and circumstances of the actual ownership situation.

Two or More Individuals. Used to designate primarily two or more individuals who have chosen not to use the legal structure of a corporation. Represents primarily various types of property partnerships.

Estates. Defined beneficially, in contrast to the previous legal definition, to signify property that has been acquired through inheritance gift, etc. (even if only for life) and which has not been broken up among the various heirs or holders, piecemeal, but is still managed or controlled collectively as part of the original estate. Thus numerous realty holding companies, corporations, etc. are actually, beneficially, considered to be estates.

Realty Corporations or *Investment Holding Companies* or *Investment-Realty Corporations.* This group may include a number of individuals joining together to purchase a property (as a syndicate) or several partners who invest in real estate through the medium of a real estate corporation.

Corporations for Their Own Use. This group refers to usual business corporations who own property for the conducting of their enterprises but who are not banks, savings and loan associations or other types of financial corporations such as insurance companies. It refers largely to stores, manufacturing or office space.

Corporations for Other Than Own Use. Defined similarly to the above, Corporations for Their Own Use, except that this case refers to property purchased by the firm for an investment (where the firm is not normally in the real estate investment business) or for expansion at a future date.

Financial Institutions for Their Own Use. Banks, savings and loan companies, insurance companies that are using property for the conducting of their business.

Financial Institutions for Other Than Own Use. Banks, savings and loan companies, and insurance companies owning property not being used for the direct running of their business. It includes property held for expansion or investment.

Other Institutions or Non-financial Institutions. Religious, educational, hospital, fraternal, and social welfare organizations.

Reliability of Deed Recordings as Indicators of Real Estate Activity

It is the purpose of this paper to test the effectiveness of deed recordings as a real estate research tool. The history of qualitative analysis of deed recordings can be traced back to the early 1930's when the studies which dealt with deed recordings as a measure of real estate transactions were first undertaken. Total deed recordings were used as a measure of real estate activity in studies made up until the 1940's when a new approach was introduced. During the 1940's, qualitative studies were carried on which dealt not only with total deed recordings as a measure of real estate activity but also with the relationship of deed recordings reflecting voluntary real estate transfers to total deed recordings. They showed that transfer series include significant proportions of transfers other than sales and that the transfers other than sales do not behave in a manner similar to that of sales.

Up to the 1950's the sample method of investigating deed recordings had been generally accepted but this was soon to be opened to question. A unique study undertaking an analysis of warranty deed samples of bonafide farm transfers as indicators of farm land market activity was published in 1954.[1] The results of this study, which were arrived at by comparison of sample data to non-sample data, indicated that only a consecutive fifteen-day sample of each month on a yearly basis ought to be considered as a possible substitute for the non-sample approach.

A research project published in 1955 went even more deeply into qualitative deed analysis by investigating the previously untested basic assumption that deed recordings are a current reflection of real estate activity.[2] This study dealt with the question of whether deed data collected according to date of recording were attributable to transfers recorded within that specified period or were a result of transactions actually occurring within that period.

The study found no appreciable difference between land prices determined from complete enumerations based on date of recording as compared with land prices computed from complete enumerations based on date of sale.

Source and Scope of Study

The data used as a basis for the study under specific discussion in this article were derived from a census of warranty and quit-claim deeds recorded 1950–1958 in Champaign-Urbana, Illinois subdivisions. The study area included all subdivisions contiguous to Champaign-Urbana regardless of location inside or outside of the city limits. The deeds used were restricted to what were considered to be voluntary fee transfers. Among the transfers eliminated from the voluntary fee grouping were sheriffs' sales, transfers between relatives, and foreclosures. The amount of federal documentary revenue stamps indicated on the deed was used as the basis for determining the value of transactions. Value for each transaction was determined on the basis of $500 for each 55 cents in federal stamps. The data for this study were collected from the files of the Associated Abstract Company of Champaign, Illinois.

The Volume of Deed Recordings as a Reflection of Current Real Estate Activity

In the study which I made of the Champaign-Urbana area, the first hypothesis subjected to testing was that deed recordings are a reliable indicator of the direction and relative change in volume of activity in the Champaign-Urbana real estate market. A census was taken of voluntary warranty and quit-claim deeds recorded 1950–1958 in Champaign-Urbana subdivisions. Time series of these deed recordings were developed in terms of five variables. These variables were: (1) date of recording of the instrument; (2) city in which the property is located; (3) subdivision in which the prop-

[1] R. Tontz, J. Kristensen, and C. Cable, Jr., "Reliability of Deed Samples as Indicators of Land Market Activity," *Land Economics*, February 1954, pp. 44–51.

[2] R. Tontz, C. Cable, Jr., and H. Wickes, Jr., "Reliability of the Yearly Deed Samples of Land Prices and Transfers," *Land Economics*, November 1955, pp. 372–378.

erty is located; (4) value of transaction; (5) date of transaction.

The hypothesis was tested by an analysis of the two main variables of the data—volume and value of deed recordings. It was felt that if these variables possessed a constant relationship over the period studied, then one variable might be used as an indicator of activity in the Champaign-Urbana real estate market. In order for recordings to have value as an indicator of activity they must show consistency with activity classed by date of transaction. Consequently, deed recordings based on date of transaction were compared with deed recordings based on date of recording for both volume and value of sales.

Examination of the volume of voluntary warranty and quit-claim deeds recorded 1950–1958 in subdivisions by comparison of data based on date of *transaction* with data based on date of *recording* indicated a similarity of movement between the two sets of data. However, the only consistent pattern of activity appeared at an annual level. Annual and also quarterly data of volume of deed recordings for the period provided a dependable manifestation of the direction of and peaks and valleys in the volume of transactions. Therefore it is concluded that a very weak relationship existed between the two sets of deed recordings by volume on a monthly basis.

Examination of the value of warranty and quit-claim deeds recorded 1950–1958 in Champaign-Urbana subdivisions by comparison of data based on date of transaction with data based on date of recording indicated the lack of any consistent similarity of movement as between the two sets of data. Irregularities present in annual and quarterly data conclusively indicated that deed recordings were an unreliable indicator of volume or direction of activity over the period studied.

Analysis of Time Lag

Although the volume of deed recordings at an annual and quarterly level seemed to be a good indicator of activity, there appeared in these data a consistent gap between deeds based on date of transaction and deeds based on date of recording. This difference takes the form of a time lag between the date of transaction of a deed and the date of recording of a deed. Before the utility of these deed recordings can be definitely established there must be a test of the extent to which the time lag limits the use of deed recordings as an indicator of the character of current real estate activity in the Champaign-Urbana voluntary fee market. In the absence of a time lag, it would be proper to use deed recordings on an annual and quarterly basis as an unqualified indicator of the characteristics of current real estate activity in the voluntary fee market. But such is not the case. Because a time lag does exist between the date of transaction and the date of recording it was analyzed in order to determine its impact upon the use of deed recordings as a reflection of the characteristics of current real estate activity in the voluntary fee market.

To gain a better understanding of the nature of the time lag, a sample of transactions showing both the date of transaction and the date of recording was taken using the time series of deeds as the source of data. A table of random numbers was used to set up a sample of approximately 7 per cent. The sample was based on the years representing the lowest, average, and highest levels of activity over the period studied. The years 1950, 1953 and 1956 were the periods selected from the sample the results of which are shown in Table I.

TABLE I—TIME SPAN BETWEEN DATE OF TRANSACTION AND DATE OF RECORDING OF DEEDS FOR CHAMPAIGN-URBANA, SELECTED YEARS

Period within which deed was recorded	1950		1953		1956	
	No. of deeds	% of total sample	No. of deeds	% of total sample	No. of deeds	% of total sample
Within 30 days	65	70	50	67	71	69
31-60 days	13	14	9	12	6	6
61-90 days	3	3	6	8	3	3
Over 90 days	12	13	10	13	23	22
TOTAL	93	100	75	100	103	100

Analysis of the time lag showed the following: (1) 67 to 70 per cent of the transactions in Champaign-Urbana in 1950, 1953 and 1956 were recorded within a thirty day period; (2) 78 to 87 per cent of the deeds transacted in Champaign-Urbana in these years were recorded within a ninety day period.

In view of the nature of the time lag in deed recordings it becomes apparent that further investigation is needed before deed recordings can be used as an indicator of the characteristics of current real estate activity in the voluntary fee market. However, the nature of the time lag is such that current deed recordings can be used as a reflection of the character of the past ninety days of real estate activity since during that period the majority of the deeds will have been recorded.

The annual and quarterly volume of deed recordings can be used to generalize on the activity of the past ninety days of real estate activity in the voluntary fee market and give a picture similar to that created when numerical data are analyzed with a moving average. Because of the presence of a time lag the annual and quarterly volume of deed recordings require further examination before they can be used to characterize real estate activity in the voluntary fee market. However, by taking the character of the time lag into account, the deed recordings can be a reliable reflector of a composite of behavior for the previous ninety days.

Having shown the extent to which the time lag exists in current deed recordings, it now becomes necessary to determine the extent to which this difference limits the utility of current deed recordings as a current reflection of the character of the voluntary fee real estate market. The presence of the time lag will not interfere with the use of deed recordings as a reflection of market activity provided it does not distort the overall view of activity over the year.

In order to test the variation in activity which might result from the time lag two tests were performed using 1950 as the test year and comparing deed values based on date of transaction with deed values based on date of recording. The tests were set up on an annual and quarterly basis and both used a frequency distribution of price ranges of deed sales as the basis of examination. Two frequency distributions served as a basis for the test, one being gathered by date of recording and the other by date of transaction. These tests were performed by comparing annual and quarterly figures for 1950. The information gathered to perform the test included the number of deed values per price range and the number of values per price range relative to the total of that price range. A comparison of deed values per price range revealed an almost identical relationship between the two frequency distributions at an annual level. A comparison of deed sales per price range on a quarterly level revealed a strong similarity not greatly different from the annual data.

The tests showed that although a time lag exists between the transaction and recording, the picture created by current deed recordings was still a reliable indicator of the characteristics of current real estate activity in the voluntary fee market in Champaign-Urbana.

Deed Recordings as an Indicator of Real Estate Activity

Current deed recordings have been established as an indicator of voluntary fee real estate activity in Champaign-Urbana. They are now used to describe the character of real estate activity in the Champaign-Urbana voluntary fee market 1950–1958. In order to measure real estate activity against the general price level the Consumer Price Index was compared to deed recordings in Champaign-Urbana for the years 1950, 1953 and 1956. Table II presents a comparison of the index price to the average price per transaction in Champaign-Urbana. Table II shows that the percentage increase in the price of the average real estate transaction in Champaign-Urbana was more than twice the percentage increase of the Consumer Price Index for the United States for the years studied.

TABLE II—AVERAGE PRICE PER FEE REAL ESTATE TRANSACTION OF CHAMPAIGN-URBANA COMPARED TO CONSUMER PRICE INDEX, SELECTED YEARS[1]

Year	Consumer Price Index		Average price per transaction of Champaign-Urbana deed recordings	
	Price	Change in percent	Price	Change in percent
1950	102.8	—	$5709	—
1953	114.4	+11.3	7454	+30.6
1956	116.2	+13.0	8118	+42.2

[1] All sales over $38000 have been eliminated in order to prevent the average from being distorted.

The character of the Champaign-Urbana real estate market is such that it can be safely assumed that transactions found

mainly within a price range of $4000 or less were for unimproved lots. Analysis of the volume and value of real estate activity in the Champaign-Urbana voluntary fee market 1950–1958 produced evidence of rising lot prices which is reflected in the following findings: (1) In 1950, 29 per cent of the deeds recorded were for less than $2,000 while 50 per cent were for less than $4000; (2) In 1958, only 5 per cent of the activity was below $2000 but 41 per cent was below $4000.

Conclusion

Time series of deed recordings were developed to test two hypotheses in this study. These hypotheses were: (1) deed recordings in Champaign-Urbana are an indicator of the direction and relative change in volume of real estate transactions and (2) deed recordings in Champaign-Urbana are a reliable indicator of the character of current real estate activity in the voluntary fee market.

The principal findings of this study were as follows: (1) the number of deeds on an annual and quarterly basis is a reliable indicator of trends in real estate activity in Champaign-Urbana, (2) a time lag exists between the dates of transaction and recording. However, the character of this time lag does not pose a serious limitation on the use of deed recordings as a tool for analysis; (3) the percentage increase of the average real estate price per transaction for Champaign-Urbana was more than twice the percentage increase of the Consumer Price Index for the United States between 1950 and 1956; (4) the price of lots in Champaign-Urbana approximately doubled over the period of 1950-1958.

Current deed recordings have been used to describe real estate activity in Champaign-Urbana but there are other areas to which this set of data might be applied. Data collected for this study could be used to trace the growth of subdivisions in Champaign-Urbana 1950–1958. These data have been coded so that a study of real estate transactions by subdivision is possible. With the data analyzed by: (1) date of recording of the transaction; (2) subdivision in which the property is located and (3) value of the transaction, it would be possible to trace the rate and direction of development and the value pattern of land uses in the entire Champaign-Urbana real estate market area. It would further be possible to test the growth pattern of Champaign-Urbana against the established theories of urban structure. In particular, the concentric circle theory and the sector theory.

Ernest and Robert Fisher in their book on *Urban Real Estate* employ the term *rate of utilization* as expressing the relation between intensity of use and inventory capacity at any time.[3] They further state that deed recordings as an index probably lag behind the rate of utilization. It would be possible, using the data collected for this study, to analyze the relationship between deed recordings and the rate of utilization.

The majority of the studies concerning the qualitative analysis of deed recordings have used deed recordings to develop a time series for analysis of the data as an indicator of the quality of the real estate market. Other studies have investigated the character of deed recordings and the reliability of samples of deed recordings. The question of whether federal internal revenue stamps affixed to deeds indicate the full value of the real estate is still not fully answered.

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[3] E. M. Fisher and R. M. Fisher, *Urban Real Estate* (New York, New York: Henry Holt and Company, Inc., 1954), p. 216.

Water Allocation By Permit In Wisconsin

THE INCREASING water use demands in the eastern states for agriculture, industry, municipalities, and recreation have led several states to consider permit systems as an allocative device. Water allocation has been governed in the eastern states by the ripar-

ian doctrine with disputes handled by the courts rather than an administrative governmental agency. Wisconsin, however, is one humid state that has developed experience in the administration of a permit system for irrigation. An analysis of the

economic consequences of the procedures, data, and allocative criteria used in granting these permits can provide guides to other states considering the need for more public control over water use.

Procedure and Data

Section 31.14 of the Wisconsin Statutes was passed in 1935 and gives the Public Service Commission authority to grant permits for the diversion of surface water for irrigation.[1] However, all irrigators were not required to have a permit until 1956. The statute does not outline in detail the procedure to be used in making decisions about permits. It does require that the Commission make two important findings: (1) that the proposed diversion of water other than surplus water[2] will not be to the injury of public rights in the stream; and (2) that all injured riparian owners, if any, have consented thereto. The two essential parts of the procedure are *notice* and *public hearing*.

The statute requires that notice of the hearing be published and that actual notice be mailed to all lower riparians by the applicant. This is interpreted to include all riparians downstream to the confluence of the stream with one of larger size where the stream loses its identity. Any party interested in or affected by the proposed diversion has the right to appear at the hearing. George Steinmetz of the Commission has listed some facts which must be determined in each case from the hearing record.[3] (1) What is the flow of the stream during periods of irrigation? (2) How much water does the applicant propose to divert and during what period of the growing season will the diversion take place? (3) How much water have other riparian owners been authorized to divert and during what periods? (4) How much water can be diverted from the stream during different stages of flow without injury to the public rights in the stream? Public rights include protection of public water supply, public health, highways, shorelines, agricultural land, hunting, fishing, stock watering and other factors depending on the situation.[4]

To determine injury to the public rights the Commission relies heavily on information provided by the rivers survey unit of the Conservation Department though it does not always concur with their judgment. As of August 15, 1958, the Department had appeared in opposition (qualified or total) in 22 hearings. Eight of these applications were denied and 12 were granted in part or with restrictions based on streamflow at the time of diversion. Only in two cases did the Commission fail to curtail the requested diversion.

The Conservation Department may enter the following types of data: stream flow, water temperature, type of habitat, species of fish found, stocking records, use of the stream for fishing or boating, effect of diversion on habitat and food supply, whether the stream provides spawning grounds, type of stream bottom, and possibility of fish stranding if water levels were lowered. The Conservation Department is especially concerned with diversions that might damage trout streams.

The Wisconsin Water Pollution Committee may enter data on the sewage load in the stream and their opinion as to how much streamflow is necessary to provide proper dilution. Individuals and sportsmen's organizations may put in their estimate of the value of various uses of the stream. City, village and town officials may give their estimates of possible pollution problems and the use of the stream by their residents.

The fifth fact which must be determined is the question: Will the proposed diversion injure other riparians and if so have they given their consent? Lower riparian owners may appear and present testimony on the effect of the proposed diversion on their use. Fear of the diversion affecting the quantity available for stock watering is a

[1] For a legal analysis of this statute see Lee M. Modjeska, "Wisconsin's Water Diversion Law: A Study of Administrative Case Law," *Wisconsin Law Review*, March 1959, pp. 279–311.

[2] Surplus water is defined as any water not being beneficially used. It is assumed that water diverted for irrigation is non-surplus since diversions occur during periods of relatively low stream flow.

[3] George P. Steinmetz, "Problems in the Application to Agriculture of Wisconsin Laws Relating to Surface Waters," *Proceedings of Water Management in Soil Conservation Districts Conference*, Madison, Wisconsin, January 10–11, 1957.

[4] Book No. 39, Opinions of the Attorney General of Wisconsin, pp. 564–566.

common objection. Utilities and private dam operators may give their evaluation of the effect of a diversion on power generation.

Though the statute requires the other riparians to give consent if the diversion is other than for surplus water the provision was not literally carried out in practice. As of August 15, 1958, twenty-one permits had been granted where riparian owners had objected. If this provision were literally interpreted it would allow a lower riparian to prevent withdrawal of water by his fellow riparians if he is damaged even to the slightest extent. The interpretation of the Commission was based on an opinion of the attorney general which pointed out that under the riparian doctrine no riparian owner has an absolute right to the flow of all the water but his right is limited by the right of the upper owner to make a reasonable use. This indicates that the rights of each must somehow be reasonable in relation to the other.[5]

The Commision interpreted the law to mean that the failure of a riparian owner to appear at the hearing did not necessarily mean that he would not be injured or that he consented. This was determined from the evidence brought out by the hearing. This practice was upset by a Dane County Circuit Court decision in March 1959. In *Nekoosa Edwards Paper Company* v. *Public Service Commission,* Judge Richard Bardwell ruled that the Commission cannot grant permits if lower riparians do not actually consent. This opinion will force a reexamination of those permits granted in spite of lower riparian objections, even if minor. This case illustrates the difficulty of working with a 1935 law which did not anticipate any significant amount of irrigation. The Commission attempted to make the old law reasonable by administrative interpretation rather than asking the legislature to update the law.

The permit hearing is conducted by a Commission examiner in much the same manner as a court trial. The permit is granted or denied on the basis of the facts brought out in the hearing record. The procedure assumes that the information necessary to make a decision which allocates water among competing users will be available from the testimony of the applicant, the Conservation Department, and other interested parties.

Implication For The Public Interest. The protection of the public interest lies in the procedure by which information is secured and the decision made. The hearing procedure can work ideally only if all interested parties are equally represented by competent legal counsel which is impossible in practice. The Milwaukee fisherman cannot be present at every hearing—not to mention the out-of-state sportsmen. The Conservation Department appears at every hearing to present data and state its judgment of the effect of the diversion on the public rights. The law does not specify that the Department shall appear nor on what basis the public recreational interest shall rest. Sportsmen do not always have a homogeneous interest with some people interested in cold, fast-water fishing, some in warm-water fishing, and others in boating and water skiing. The law which merely states that the permit cannot be granted if the diversion harms the public rights raises the question of which part of the public is to be considered. The picture is further complicated by the fact that another section of the public benefits from irrigation development. Yet there is no state agency which puts in data showing the economic benefits to the community of such development.

If the permit decision is to reflect equally all interests, some systematic gathering of the necessary information is needed. If this information is not developed at the hearing or if the testimony is conflicting, the Commission should conduct investigations of its own.

Another procedural question is raised by the physical relationship of surface and ground water. Administration of water laws in Wisconsin is based not on recognition of the hydrologic cycle but on where the water momentarily happens to be. The State Board of Health administers permits for wells and the Public Service Commission has no authority to consider alternative sources of water when an application is made for a stream diversion permit.

Allocation Criteria

The criteria used in stream permit rulings are not spelled out in the statutes or in

[5] *Ibid.*

any administrative code but are ascertainable only upon study of the hearings.

Allocation Between Irrigation and Other Uses. Examination of the permits that were denied indicates that the important reasons were the effect of the proposed withdrawals on fish life and sewage dilution. The amount of streamflow is the critical item in both considerations. Up to August 15, 1958, there were 106 stream permits issued and 22 denied. Of those denied two were for technical reasons. Of the remaining 20, the measured streamflow[6] was predominately less than 10 cubic feet per second. Only in three cases was the flow greater than 10 cubic feet per second.

There were only four permits granted unconditionally where the streamflow was less than 10 cubic feet per second and these were granted for relatively small amounts (less than 1 cubic foot per second). These streams did not appear to be trout streams and the Conservation Department opposed only one of these permits because the stream was a source of minnows. Out of the 106 permits granted, 38 were issued with conditions. Three of these conditional permits allowed diversion every third year as per the applicants' requests. One permit restricted the hours of pumpage allowed per year only and another specified the hours of the day when pumping was allowed. The other 33 conditional permits correlated the amount that could be withdrawn with given amounts of streamflow[7] and some required that permitees on the same stream not divert at the same time. Of this group of conditioned permits only six had a streamflow greater than 10 cubic feet per second.

The above analysis seems to suggest a rule of thumb which can be gleaned from the rulings of the Public Service Commission. A streamflow of 10 cubic feet per second is somewhat of a lower limit below which few permits are granted and above which few have been denied. It is realized that this lower limit of 10 cubic feet per second is not a fixed standard. There is a range on either side of it which still makes it necessary to consider each case individually.

Several permits have been denied or restricted because of insufficient streamflow for sewage effluent dilution. In one case the amount of flow necessary for dilution of a city's sewage was established and the irrigator could not irrigate when the flow reached that point. This is a modification of the riparian doctrine in practice since the existing need for sewage dilution is given a prior right.

The minimum flow principle which protects fishing and sewage disposal interests has been suggested in several humid states and adopted in the 1956 Mississippi law. Although the principle is not stated in the Wisconsin law it is evident in the rulings of the Commission. A 1959 amendment to the water diversion statute provides that no new permits shall issue for diversion from any trout stream without approval of the Conservation Commission. The amendment also requires an annual review of all permits with withdrawal of the permit upon request of the Conservation Commission if it is found to be detrimental to other riparians or to the stream or lake. Again the law specifies no standards and criteria for administration of these changes. It is too early to determine what administrative policy will develop and what the consequences will be.

Where Water Can Be Used. A question which is closely tied to the allocative criteria is where the water may be applied. In the absence of statutory direction the Commission has administratively restricted water use to riparian land which is defined as the units of land part of which touched a stream which had come down from the original government patent in a continuous chain of title. The amount of riparian land can never be expanded but continually decreases as parcels become separated by sale from the 40-acre tracts which actually touch the water. This definition has important consequences for irrigation. The riparian portion of one's property may be the poorest land. In addition such restriction may interfere with a rotation system and prevent the best source of water from being used.

[6] The Commission would prefer to have data on the average or ordinary low flow which is the flow 95 percent of the time but often the only data available is the flow recorded at the time of the hearing.

[7] In practice it is difficult to administer permits where withdrawal is to be correlated with streamflow since the irrigator periodically sends the Commission the readings on a graduated stake and then must wait a reply translating the reading to cubic feet per second.

The stringent effect of this definition was softened temporarily in 1957 and 1959 by the legislature, which allowed the use of water on land which is contiguous to riparian land.

The narrow definition of riparian land has the effect of curtailing the amount of land that can be irrigated and thus the demand for water for irrigation. From an economic viewpoint the amount of water available for irrigation should be used on the best possible land rather than land riparian by some narrow definition. However, support will remain for the narrow definition until recreational users can point to specific criteria and procedures which they feel confident will prevent diversion harmful to fishlife. Perhaps if the present informal minimum-flow principle were spelled out in the law the recreational interests would not object to the use of the water available for irrigation on the best land.

Allocation Among Irrigators. The common law riparian doctrine requires that each riparian's use be reasonable in comparison with other riparians. The Wisconsin statute does not specify how water shall be divided between various riparians. Examination of the permits indicates no close relationship between the amount of riparian land of each owner and the amount of water granted. On one river with 11 permits in 1958 the Commission granted no more than two cubic feet per second regardless of acreage. The Commission has not yet called in any previous permits to reapportion the water. On new permits it has required that permittees on the same stream irrigate at different times.

One of the commissioners has stated that if there is not enough water for all permittees on a particular stream all permits would be called in and reapportioned.[8] Although past permits are not completely consistent it would appear that this reapportionment would be equal among riparians regardless of acreage. Such a policy takes no cognizance of any lower limits to the amount of water necessary for an irrigator to stay in business. The quantity of water available to each irrigator may become so small that the marginal returns of the last unit of water available may not equal the marginal costs. There is need to recognize this lower limit to the quantity allocated to each irrigator as there is recognition of the minimum-flow principle to protect recreational use.

High Capacity Well Permits

Section 144.03 of the Wisconsin Statutes gives the State Board of Health the authority to grant permits for all wells having a capacity of over 100,000 gallons a day.[9] The administration of this law is not as involved as the granting of stream diversion permits as there is no concern with the balancing of interests.

The well permit applicant is furnished a form on which to provide information necessary to review the application. If the information supplied indicates a possibility of interference to nearby public utility wells further computation is made. If available, United States Geological Survey coefficients of storage and transmissibility and other characteristics of the aquifer are used. If they are not available the Board may conduct pumping tests. If this cannot be done then known values of coefficients are used assuming the worst conditions that could prevail. If no interference to municipal utility wells is expected the permit is issued. The law does not provide for the consideration of interference with other kinds of wells or the weighing of the interests of the municipal and private users.

When necessary, permit approvals are granted subject to limitations of pumpage per day, pumping rate per minute, or time of operation. Curtailment of pumping might be requested if found necessary; or, as soon as a city water service is available, such service must be used in lieu of a well. Nearly all permits require permission to determine water levels and to furnish reports on water levels and pumpage.

There is little in the State Board of Health experience with the high capacity well law which could form the basis for the

[8] Minutes of Wisconsin Legislative Council Water Resources Committee, Madison, Wisconsin, August 25, 1958, p. 13.

[9] For a legal analysis of ground water law see, Kenneth F. Hostak, "Wisconsin Ground Water Law —A New Era," *Wisconsin Law Review*, March 1957, pp. 309–338.

extension of protection from interference for municipal wells to all existing wells since the present law avoids all such considerations.[10]

Conclusions

The working rules and allocative criteria for water diversion are not specified in the Wisconsin statutes. The criteria used by the Public Service Commission have evolved out of their experience. It is desirable to have procedures which are flexible and adaptable to changing conditions. However, as new problems develop, major policy decisions arise which involve compromise of competing users. These policy decisions should be open to public debate and made by the legislative process.

The principle of protecting a minimum low flow is well established in the Commission's rulings and appears to be workable. This is an important policy decision and should be a part of the law so that all users know where they stand. Other criteria with more questionable economic soundness are the narrow definition of riparian land and the failure to recognize that when allocating water among irrigators the share available to each may become so small that it is uneconomical to use.

It is not enough for the law merely to state that the permit shall be granted if it appears from the hearing record that the public rights are not violated. Public rights must be operationally defined and the important data must be obtained by systematic investigation. The procedure of judging whether an application for diversion harms any public rights is an oversimplification of the problems.

One particular use cannot be stamped with the label "public" to the exclusion of all others. Even the right of fishing in navigable streams is not a single interest. This is illustrated by the 1959 amendment which prevents diversion from trout streams. Are trout fishermen more "public" than bass fishermen? All uses including irrigation contribute to the public benefit and some procedure should be employed which attempts to weigh the gains of one group against the loss to others. This principle was adopted in Wisconsin in 1959 in a special water permit law for low-grade iron ore beneficiation. This law provides that the permit shall issue if the public benefits which will result from the operation outweigh the public rights in the stream which will be impaired. This is an important directional policy decision which will contribute to better resource use.

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[10] The Board of Health has some applicable experience in administering a well driller licensing law. See the author's, "Wisconsin Drinking Water Law and Current Ground Water Problems," *Journal American Water Works Association*, December 1959, pp. 1503–1510.

Factors Associated with the Location of Supplemental Irrigation in the Humid Area †

THE ADOPTION OF IRRIGATION as a means of stabilizing moisture distribution throughout the growing season has been extremely rapid in the regions within the humid area[1] of the United States and has attracted considerable attention. Examination of county data in the *Census of Agriculture 1954* discloses heavy concentrations of irrigated acreages in certain localities with little or no irrigation in other counties. The factors which account for this distribution and which will determine the future distribution of irrigated acreage are of importance to those persons concerned with the formulation of both water resource development programs and with programs

† The results of the study on which this article is based are reported in greater detail in the author's unpublished Ph.D. thesis, *The Contribution of Supplemental Irrigation to Agricultural Output in the Eastern United States*, Purdue University, Lafayette, Indiana, January 1960. The author acknowledges his appreciation of the helpful comments and criticisms of V. W. Ruttan.

[1] The term *humid area* refers to the thirty-one Eastern States which lie wholly east of the 97th meridian west longitude.

TABLE I—IRRIGATED LAND IN FARMS, THIRTY-ONE EASTERN STATES, BY REGIONS: 1949–1954

(From United States Census of Agriculture)

Region	*1949*	*1954*
Northeast	87,000	188,000
Lake States	28,000	51,000
Corn Belt	16,000	69,000
Appalachian	6,000	85,000
Southeast	12,000	63,000
Florida	363,000	428,000
Delta	1,004,000	1,698,000
TOTAL (31 States)	1,516,000	2,582,000

designed to achieve overall supply adjustments. This discussion is an attempt to shed some light on the relationships that have existed with the hope that some clue to future behavior can be found.

Some of the most frequently suggested determinants of the location of supplemental irrigation are: seasonal rainfall distribution, soil types, availability and cost of water, types of crops and produce grown, and the market potential for produce grown. Four hypotheses (two based on physical factors and two based on economic factors) with respect to the effect of these variables are treated in this paper. The assumptions are that the irrigated acreage in a humid area region will be positively associated with: (1) large deficits in moisture which occur during the growing season; (2) local climatic conditions that favor the production of high water-requirements crops such as rice; (3) limitations imposed by public policy on such crops as cotton and tobacco; and (4) concentrations of high value per acre, market-oriented, perishable crops and produce such as fresh fruits, vegetables and dairy products.

The humid area was divided into seven regions closely corresponding to the United States Department of Agriculture type of farming regions: Northeast, Lake States, Corn Belt, Appalachian, Southeast, Florida, and the Delta. A regression equation was estimated for each region containing the following variables:

X_0=percentage of cropland irrigated in 1954
X_1=value of crops sold per acre in 1954
X_2=mean annual water deficit[2]
X_3=mean annual water surplus[2]
X_4=percentage of cropland in specialty crops in 1954[3]
X_5=percentage of population nonfarm in 1950[4]
X_6=whole fluid milk—percent of gross sales in 1954

In the Appalachian, Southeast, Florida and Delta regions, an additional variable (X_7= percentage of cropland in cotton in 1954) was included. In the Delta region, X_8= percentage of cropland in rice in 1954 was included in the relationship.

Where relevant, the data were enumerated from the *Census of Agriculture 1954* and the *Census of Population 1950* by county for each county in the thirty-one states included in the study area. The percentage of cropland irrigated was considered as the dependent variable and the remaining variables were considered as independent variables.

Variables which were, according to a priori reasoning, a part of each regional relationship were included in the initial estimating equation. Variables which yielded regression coefficients that were either small relative to their standard errors or which bore a sign contrary to the hypothesized relationship were eliminated from the equation. The standardized partial regression coefficients for the variables in the final equation are shown in Table II as well as the coefficient of multiple correlation squared.[5]

Examination of Table II shows the relative importance of the variables used in the final equation in explaining variation in the dependent variable X_0, percentage of cropland irrigated. It can be noted that only in Florida did either of the variables expressing the effect of moisture deficit or sur-

[2] The variables X_2 and X_3 were tabulated from C. W. Thornthwaite, John R. Mather, and Douglas B. Carter, *Three Water Balance Maps of Eastern North America* (Washington, D. C.: Resources for the Future, Inc., 1958).

[3] Specialty crops include such crops as tobacco, broom corn, vegetables, tree fruits, berries, mint, etc.

[4] Population nonfarm is defined as total population minus rural farm population.

[5] See Bernard Ostle, *Statistics in Research* (Ames, Iowa: Iowa State College Press, 1956), pp. 215–222, for definition and method of computing these statistics.

TABLE II—VARIABLES ASSOCIATED WITH THE LOCATION OF IRRIGATION, 31 EASTERN STATES, BY REGION: 1954[1]

Variable \ Region	Northeast B_i	Lake States B_i	Corn Belt B_i	Appalachian B_i	Southeast B_i	Florida B_i	Delta B_i
Value of crops sold per acre X_1	.6465	.4685	.3494	—	.1434	.4803	.0639
Mean annual water deficit X_2	—	—	.0306	.0491	—	—	.0222
Mean annual water surplus X_3	—	—	—	-.0207	—	-.2763	—
Percentage of cropland in specialty crops X_4	.3395	.3189	.3945	.5404	.1173	—	—
Percentage population nonfarm X_5	.0495	—	—	.0989	.2402	.1002	.0094
Whole fluid milk—percent gross sales X_6	.0799	.1726	.2228	.1046	.0280	.0452	.0168
Percentage of cropland in cotton X_7	—	—	—	.0132	—	.1010	—
Percentage of cropland in rice X_8	—	—	—	—	—	—	.9712
TOTAL EXPLAINED VARIATION R^2 0.12....k	.7684	.4882	.4396	.3119	.1162	.4360	.9770

[1] These are the results of multiple regression analysis. The coefficients shown are the standardized partial regression coefficients and the multiple correlation coefficient squared.

plus bear any appreciable explanatory value. Failure of these variables to account for significant variations in the percentage of cropland irrigated is probably due to lack of sufficient precision to distinguish significant variation among counties within the individual type of farming regions.

In the Northeast, the Lake States and in Florida the value of crops sold per acre (X_1) was the most important variable in terms of its explanatory value. This is consistent with the generally held idea that these areas are producers of large quantities of high value crops. In the Corn Belt the percentage of cropland in specialty crops (X_4) was the most important variable. This is no doubt due to the fact that irrigation is associated with specialty crops and yet these crops are not a sufficiently large part of the total Corn Belt output to cause the value of crops sold per acre (X_1) to be strongly associated with irrigated acreage. The same situation prevailed in the Appalachian Region to an even greater degree. The percentage of population nonfarm (X_5) had the greatest explanatory value in the Southeast which might suggest more readily available water supplies near urban areas in that region as a contributing factor to the adoption of irrigation. As expected, the precentage of cropland in rice (X_8) was the most valuable explanatory variable in the Delta and completely overshadowed any other factor.

It should be noted that the variable which expressed the effect of dairying (X_6) was of greatest value in the Corn Belt and had the least value in the Delta. This suggests the importance of the use of irrigation for pasture in the Midwest where late summer droughts tend to cause pasture quality to decline and thus affect milk production. It also suggests the relatively minor importance of irrigated pasture in the Delta region. Cotton acreage did not exhibit nearly the effect expected, particularly in the Delta, where it was completely dominated by rice acreage.

The general conclusions to be drawn are these. (1) Factors which are related to the demand for high value crops are positively associated with the location of irrigation in the humid area and this association is closest in the heavily populated regions. (2) The relative importance of dairying is positively associated with the location of irrigation in every region and particularly so in the Lake

States and the Corn Belt. (3) The concentration of specialty crops is most closely associated with irrigation in the Appalachian and Corn Belt regions and is of no value in explaining variation in irrigated acreage in the Delta and in Florida. (4) Rice acreage is very important in explaining variation in the acreage of cropland irrigated in the Delta. (5) Variables that are associated with the demand for irrigation-produced crops are associated closely enough in some regions to suggest that irrigation development has not yet reached the point in these regions where physical factors are dominant, i.e., water availability and cost, etc. In other areas, i.e., the Delta and Florida, where irrigation is highly developed, physical factors are clearly dominant.

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Book Reviews

Benefit-Cost Analysis and Water Pollution Control. By R. S. Hammond. Stanford, California: Food Research Institute Miscellaneous Publication Number 13, 1959, pp. 95.

This monograph is concerned with benefit-cost analysis in general and water pollution problems in particular. The report is the product of a contract between the Food Research Institute at Stanford University and the United States Department of Health, Education and Welfare.

It is divided into five chapters. The first two deal with benefit-cost in general with attention given to historical development as well as analytical and empirical problems. Chapter III is a description of the water pollution problem. Evaluation of investment in water pollution control is treated in Chapter IV. Chapter V is actually a summary and conclusion although it is entitled, "Further Outlook."

Hammond's viewpoint is that of the skeptic as far as extensive application of benefit-cost analysis is concerned. With respect to its use in evaluating investment in water pollution control he says, " . . . the onus of proving the applicability of a particular technique of analysis to a set of phenomena rests on those who would apply it and that in this particular instance that onus has not been discharged; it has simply been assumed the phenomena were, indeed ought to be, amenable to classification in terms of investment and return." (p. 62)

Hammond views problems from the standpoint of "the professional administrator whose duty it is to make decisions, or to recommend a course of action to his political chief." (p. 17) The viewpoint is one that does not dogmatically accept the efficiency framework and view with horror any result which is not consistent with the pattern of resource allocation this framework dictates. The approach permits the author to raise interesting and relevant questions about the usefulness of benefit-cost analysis when used to evaluate public investment. For guidance of the assumed administrator, Hammond turns to the "Green Book" and draws conclusions with respect to its possible usefulness. (United States Federal Interagency River Basin Committee, Sub-committee on Benefits and Costs, *Proposed Practices for Economic Analysis of River Basin Projects,* 1950 edition.) He offers nine suggestions that would rehabilitate a "useful though limited" administrative tool, that is, benefit-cost analysis. Worth mentioning here is the conclusion that the principal usefulness of benefit-cost is to summarize the viability of a project but that it should not be used to rank projects of different kinds on the basis of economic efficiency. In other words, he calls for a return to the original intent of benefit-cost which was to "winnow" out the more undesirable projects.

With respect to the economics of water pollution, Hammond makes explicit many of the problems involved in measuring

benefits and costs as well as their incidence. He believes it may be possible to estimate the cost side of the equation but is dubious about our ability or the necessity of estimating benefits. He says: "Like parks and museums, or even schools, sewers and treatment plants may quite properly be regarded as items of collective consumption, yielding satisfactions that need no justification beyond the prudent housewife's question, 'Can we afford it?' They have their analogues not only in the household but in the business world, such as the grandiose buildings beloved of many great corporations." (p. 54) He believes that present water pricing practices create the illusion that water is less costly than is actually the case. If it were priced more realistically, development of sewage reclamation plants would be encouraged. He rejects the idea of private water markets which would undoubtedly raise the price of water. He recognizes that politicians and civil servants make mistakes, but he believes they are not out of control and that it is naive to test their decisions with the criterion of the "perfect market."

The perspective Hammond supplies with respect to proper use of benefit-cost analysis is needed. The current tendency of some writers to treat the benefit-cost ratio as a necessary and a sufficient condition, rather than just a necessary condition rests on shaky ground. The appealing notion of establishing a private market for water is treated with considerable realism. Yet there is much that can be questioned which is inevitable in a work of this length that deals with broad and complex subjects. The imaginary "administrator" whose eyes are being used to view the problem is in the nature of a literary fiction. A somewhat more detailed look at the administrative process is needed in order to say what the administrator will and will not find useful. Hammond's criticisms of the "Green Book" are lacking somewhat in relevance when the origin of that book is considered. Prepared by an interagency group with no one to impose consistent logic and practices, it seems somewhat naive to subject it to tests of logical and operational consistency. The "Green Book" represents compromises of personnel from different agencies which have varying objectives in connection with resource development. The progress this group has made, by some standards, is remarkable. Even though it is possible to claim too much for a technique, it is also possible to over-depreciate it. Although the value of benefit-cost in the "winnowing" process is unknown, it is known that projects are not being built currently because of unfavorable benefit-cost ratios. One may also be disturbed by the suggestion that water pollution control should be undertaken if we can "afford it." How does the prudent housewife or prudent administrator decide this? It seems quite unsatisfactory to simply ask the administrator "to study and reflect upon each individual case, in the light of such general guidance as the economist can offer, and such factual evidence as he himself can muster." (p. 77) Perhaps this is all that can be said at this time but explicit recognition should be given to the fact that it begs the question.

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Editor's Note. Homer Hoyt of Washington, D. C., member of the Editorial Board of this *journal,* has called our attention to two publications which he speaks of as indispensable reference books for scholars whose professional interests are within the general areas embraced by *Land Economics.* His observations on the contents of both books accompany the listing of the two titles below.

Worldmark Encyclopedia of the Nations. New York, New York: Worldmark Press, Inc. and Harper & Brothers, 1960, pp. 1456. $30.

This remarkable volume, the product of eleven years of research, to which over 80 experts in different nations made contributions, presents the latest and most authoritative statistics and a concise analysis of the economy, history, climate and government of 119 nations ranging in size from Monaco, San Marino and Liechtenstein to the Union of Soviet Socialist Republics, China and the United States of America. Population estimates for every nation and the principal cities for 1957 to April 1960 as well as their latest official census, the most recent data on national income, agriculture, industry, pub-

lic finance and taxation, transportation, mining, labor, energy and power, domestic and foreign trade and banking, furnish the reader with a current view of the economic status of every nation in the world. In addition to this extensive economic coverage there are concise accounts of topography, climate, ethnic groups, language, religion, history, government, political parties, armed forces, migration, housing, tourism, education, libraries, and museums, the press and famous nationals.

It was an extraordinary feat to compress so much vital, factual data into a single volume, of which the 1178 pages in Part I are devoted to the descriptions of each separate nation; the 270 pages in Part II to the United Nations system, and 32 pages to world maps in color. A bibliography for each separate country, prepared by experts, provides the starting point for further detailed studies. A scholar could search through thousands of books or whole encyclopedias in the Library of Congress and still not collect the material that is presented here within one cover. There are only a few books which would present data for as late as April of the year of publication for any single economic or social factor for any single country, while this one volume encyclopedia furnished the latest factual data on all of these subjects for every nation. This volume not only opens the door to the examination of the character of any national state, regardless of its size, but it makes possible for a student, without undue effort, to make a quick comparison of the living standards of every country on the globe at a time when it is of vital importance to all of us to understand and cultivate the friendship of peoples living outside our borders. *The Worldmark Encyclopedia of the Nations* is an indispensable reference work for every college and university and library in the nation.

HOMER HOYT

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What Makes Shopping Centers Tick. By Samuel Feinberg. New York, New York: Fairchild Publications, Inc. 1960, pp. 121. $2.50.

A new type of shopping center in which a group of stores planned, developed and owned as a unit, with a large parking area either in front of or encircling the stores, has come into existence in the United States since the end of World War II. Prior to 1946 there were only a few isolated examples of this new type of retail aggregation but now there are over 5,000 of these centers, each of which occupies a ground area of from five to 100 acres. A student of retail trade in the United States must make first-hand observations to acquire a knowledge of these developments which have risen in the past decade for there is yet only a scanty literature on the subject. Samuel Feinberg, a featured columnist of *Women's Wear Daily,* presents one of the best eye-witness accounts of this movement. He has visited the new centers in leading cities; he speaks the language of the store owners and managers, and he has presented here a concise analysis of the progress and problems of these centers. This publication is an invaluable case book of this new method of retail merchandising.

HOMER HOYT

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